THE IRON TRADE REVIEW

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RAILROAD DELAYS

CAUSE CONTROVERSIES BETWEEN SELLERS AND BUYERS.

Significant Purchase of Foreign Iron.—Independents Advance Quotations in Plates.—Strong Demand for Finished Materials.

Many pig iron buyers are showing dissatisfaction with present conditions, both as to prices and deliveries. The exceedingly retarded shipments, especially from the south, are exasperating, and the offering of spot iron at high prices has not tended to mollify the feelings of purchasers having contracts on which little iron is being delivered. This feeling has found expression in the general tendency toward caution in placing contracts for northern irons for the second half of the year and for southern iron for the second quarter, and also in the action of the International Harvester Co., in purchasing 3,500 tons of Scotch and English iron for use in the manufacture of machinery for exporting, on which the drawback privilege will be exercised, making the delivered cost several dollars below that of American iron. The same company will make further purchases and its policy may be followed by other manufacturers who engage in export business.

Railroad Delays. Sellers of pig iron insist that they are doing their utmost to make deliveries and that the railroad service was never so poor as it has been recently. They say the shippers are making every possible effort to expedite the movement of freight cars. The reports which have been widely circulated that the railroads have decided to curtail expenditures during the coming year have been carefully investigated by IRON TRADE REVIEW correspondents and found to be without foundation There is abundant reason for believing that the purchases of the railroads next year will be fully as great as they have this year. Never was the demand for increased equipment and trackage so strong, and it would be difficult for the railroads to reduce their purchases even if for financial reasons they desire to do so.

Finished Materials. The car shortage is being keenly felt by many mills as well as by the furnaces. There is serious congestion in the Pittsburg and Youngstown districts and manufacturers are notifying their customers that they may expect very slow deliveries. The large independent interests have advanced quotations on plates $2 per ton and the principal producer is expected to make a similar announcement at an early date. Nearly all producers have sold their output for the first half of 1907. Sales of rails and track material involve a larger tonnage than for some time past. Business in wire and wire nails is unusually heavy for this time of the year, and mills are not very anxious for new business.

Steel Bars Active. Following the recent advance in steel bars new orders have been more numerous than was expected. Specifications are very heavy and some of the independent interests are asking premiums. New business in bar iron has not been heavy at the advanced quotations, as there is a natural tendency to use steel on account of its lower price. There is a noticeable improvement in the demand for structural material following the lull in buying which gave some relief to the mills. The production of sheets is very large and it is anticipated that the tonnage for 1906 will exceed the record by more than 200,000 tons.

Coke and Old Material. The coke market is active and complaints of slow deliveries do not abate. Very few box cars are available. The demand for cast iron scrap continues to be the most active factor in the old material market. The settlement of strikes in eastern Pennsylvania has increased the demand for scrap in that section.

CAR SHORTAGE

Causes Much Embarrassment to Canadian Manufacturers.

(Special Correspondence.)

Toronto, Canada, Nov. 24. — The iron and steel trade in common with other large industries is sustaining much loss and inconvenience owing to the shortage of railroad cars and locomotives. Shipments have been greatly delayed and important contracts lost or postponed owing to this cause. This is an annually recurring difficulty at this time of year, but the present season is the worst ever experienced in this respect. The Canadian Manufacturers' Association and other organizations representing the lumber, milling and other staple interests, have made strong protests both to all railroads and to the Dominion Railway Commission, but so far without effect. The railroads say they are doing the best they can with the rolling stock on hand, which, if true, shows that the present supply is entirely inadequate to meet existing requirements. The Canadian Pacific railway is turning out box cars at the rate of 24 per day and is better provided than the Grand Trunk. The latter road is laying off many old cars, as unsuitable for present traffic methods, and such additions as it is making do not more than suffice to keep its supply up to the normal standard. The contention on behalf of the railroads is that if they put on sufficient rolling stock to satisfy all requirements during the rush season, when the movement of the crops absorbs so large a share of their equipment, a considerable percentage would be idle for a great part of the year. The shippers naturally do not regard this as a sufficient excuse for a condition which is practically paralyzing some important lines of industry. The Canadian Manufacturers' Association has urged on the Railway Commision the adoption of the principle of reciprocal demurrage,

THE WEEK IN IRON CENTERS.

PITTSBURG.

Buyers are Cautious as to Future. — Improved Demand for Shapes.

Office of THE IRON TRADE REVIEW. }
521 PARK BUILDING, NOV. 28 }

With the exception of a slight indication of a let-up in the demand for foundry irons for advance deliveries and a disposition to believe that prices have gone about as high as they should be allowed to go, there has been no change in the general situation during the week under review. The demand for structural material has improved, and the leading independent plate interests have advanced quotations $2. The Steel Corporation will probably make the same advance soon.

The sheet and tin plate market is much better now than is usual at this time of the year, and if present production records can be maintained through the remainder of the year, the output of the leading interest will exceed that of last year by over 200,000 tons. Very heavy specifications are being received on steel bar and plate contracts and on rails the business last week was better than it had been any week for several months.

There is still some non-Bessemer ore for sale for next year, but as far as can be learned the Bessemer grades have been cleaned up.

Pig Iron.—The pig iron inquiries received during the past week have not been as large as the week previous and a feeling prevails that the high mark for advance deliveries has been reached on foundry iron at least. Foundries are not getting such prices for their castings as would warrant paying any higher prices for their raw material and except where they are compelled to buy, they are not doing so. There has been some buying past the second quarter, but it has been comparatively small. For first half delivery we quote $22.50 to $23 on northern No. 2 foundry, and report the sale of 1,000 tons for second and third quarter at $22.75, delivered. Southern No. 2 for spot delivery is quoted at $25 Birmingham, but this price was made prohibitive to discourage acceptance. On second quarter deliveries southern No. 2 is quoted $18.50 to $19.

Within the past few days, we note the sale of 14,000 tons of northern gray forge iron for delivery February to June at $22.00 furnace to the United States Cast Iron Pipe & Foundry Co. for its Ohio plants, freight being much less than valley freights.

About 15,000 tons of malleable Bessemer was sold during the week for second quarter at $21.50, valley, and for third quarter at $21. For December delivery a tonnage of basic went at $22.50 and for second quarter at $21.75 to $22. Two thousand tons of Bessemer went at $22.85 valley, and 1,000 tons at $23. For first half deliveries we quote as follows:

Bessemer Valley	22.50 to 23.00
Bessemer, Pittsburg	23.35 to 23.85
No. 1 Foundry, Pittsburg	22.85 to 23.10
No. 2 Foundry, Pittsburg	23.35 to 23.60
Gray Forge, Pittsburg	21.50 to 22.00
Basic, Valley	22.00 to 22.50
Basic, Pittsburg	22.85 to 23.10

Steel. — Semi-finished material is scarce and there is very little to be obtained at any price, although the distribution is better now than it has been for some time past, due to the action of the leading interest some time ago in asking some of its contract customers to place business with other mills in order to relieve the general situation. This has to a great extent relieved the pressure and consumers are getting nearer their requirements than they have been getting in the early and middle part of the year. A slacking up in the demand for structural material, indications of which are now disappearing, has made it possible to divert this steel to other lines, but the heavy demand for plates and bars about equalized conditions. Soft Bessemer billets are quoted $28.50 to $29, nominal, and open-hearth $1 to $1.50 in advance. The monthly adjustment of sheet bar prices on Nov. 20 resulted in no change, the nominal price remaining $30, Pittsburg. One sale of a fair tonnage is noted by a mill not in the immediate Pittsburg district at $33, mill, for sheet bars. One lot of open-hearth forging billets, 20 carbon, was sold this week at $40, Pittsburg.

Skelp.—It is next to impossible to secure open-hearth skelp in the market at this time and very little Bessemer or iron skelp is being offered. Specifications against old contracts continue heavy on account of the large amount of business now on the books of pipe mills. On the narrow widths and light gauges we quote as follows, wide gauges taking the plate schedule:

Bessemer grooved, 1.70c to 1.75c; sheared, 1.70c to 1.75c; basic, grooved, 1.80c to 1.85c; sheared, 1.75c to 1.80c; iron skelp, 2.15c to 2.25c.

Rails and Track Material. — Local mills, during the week under review have accepted orders for approximately 60,000 tons of standard rails for 1907 deliveries and the inquiry has been better than for a long time past. The orders, none of which were of large tonnages, were well distributed between steam roads and traction lines. About 6,000 tons of light rails, or about three times the weekly capacity of the mills, were placed and deliveries on this commodity now average from five to six months. Rail mills are very well satisfied with the situation, having business on the books for the greater part of next year and inquiries in hand for some large tonnages. The demand for both iron and steel railroad spikes is very heavy and deliveries are not promised on new business short of four to six months. For prompt deliveries a large consignment of iron spikes was brought into the Pittsburg territory from west of Chicago at a figure considerably above the maximum here quoted. We quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $33; 20 to 45 pounds, $32; angle bars for standard sections, 1.50c; spikes, $2.50 to $2.75 for forward deliveries.

Muck Bar.—Muck bar, with a majority of the producers out of the market, and very little offered, has advanced, due to the advance in forge iron and scrap and we quote $36.50 to $37 on all pig metal bar and $33.50 to $34 on scrap bar.

Merchant Bars. — The amount of new business in steel bars is surprising, inasmuch as it was thought before the advance of two weeks ago that most of the buying had been done. Specifications are very heavy and mills are now only promising on advanced deliveries with the exception of one or two of the smaller concerns which are asking premiums from $5 to $6 per ton over the market for nearby shipments and they are obtaining it without difficulty. The absolute minimum is 1.60c, base Pittsburg, by the leading interests and one producer is quoting 1.65c on new business, but as yet had not taken any at this figure for future deliveries. There has been but comparatively little bar iron business moving, but that taken is on the 1.80c base Pittsburg, for the common bar, with refined bar of special brands and for special purposes running $4 to $6 higher. Some idea of the tremendous steel for tonnages placed for deliveries into next year may be obtained when it is stated that one concern

has on its books practically 1,000,000 tons of material taking the steel bar schedule of prices. New business is not being sought, and for the most part it is a case of picking and choosing, taking only the cream and discarding all else, and even extending to a refusal of business calling for special steels, or parts of requirements. We quote as follows:

Common iron bars, 1.80c in carload lots, 1.85c in less than carloads; Bessemer steel bars, 1.60c, plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c, sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1¼ inch by ½ inch, 1.75c base half extra, tire list. Iron tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Wire and Wire Nails.—Conditions in this trade are really abnormal and a particularly heavy drive is being made in wire fencing, smooth and barb wire and wire nails. As the greater part of the wire fencing is handled through retailers, these buyers are now placing big orders in proportion to sales and stocking for deliveries to be made in February and March. Good crop returns this year are reflected by the willingness of farmers to make improvements, and while the bulk of the business now being placed is in comparatively small lots, one to two carloads, the aggregate tonnage is very large. Mills have as much business as they care to accept for the contract period, being practically the capacity to produce and are not strenuously seeking new business, enough coming in through the regular channels to give them all they can handle. While the mills in this district are, broadly speaking, but small factors in the whole general business of the country, reports being received are that conditions reported are general. We quote as follows:

Wire nails, jobbers' carload lots, $1.90; retailers' carload lots, $1.95; less than carloads, $2; painted barb wire, $2.05 for jobbers in carloads, retailers in carloads, $2.10, and less than carloads, $2.20, with 30c for galvanizing; plain wire, $1.75 to jobbers and $1.80 by carload.

Sheets.—November bids fair to exceed any previous month in the production of sheets and if the present rate of output can be maintained through the remaining part of this month and the month of December, the year 1906 will be a record breaker by over 200,000 tons. In spite of the fact that this is usually an off time of the year and specifications and new business light, specifications are now coming in from all parts of the country, a large proportion for prompt deliveries, but mostly for anticipated requirements. No particular effort is being made to secure second quarter business, but a good tonnage has been offered and accepted. The leading interest is now operating almost full capacity on sheets, and has made a considerable gain in this respect over the preceding week. We quote:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized, Nos. 10-11, 2.55c; Nos. 12-14, 2.65c; Nos. 15-16, 2.75c; Nos. 17-21, 2.90c; Nos. 22-24, 3.05c; Nos. 25-26, 3.25c; No. 27, 3.45c; No. 28, 3.65c; No. 29, 3.90c; No. 30, 4.15c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½ inch corrugation and $3.15 per square No. 26 galvanized, 2½ inch corrugation. Blue annealed sheets, No. 10 and heavier 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c.

Tin Plate.—The demand, while it has been light in comparison to the past few months is heavy for this time of the year and the business will exceed any previous November. There has been a gain in the number of mills in operation. Car supply, of the kind wanted for shipment of this class of material, has not improved. We quote:

Coke tin plates, 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in 10 days.

Ferro-Manganese. — The imported grades of ferro-manganese, 80 per cent, for which there has been but comparatively little demand during the past week, are quoted nominally $80 to $82.50, delivered. Imported 50 per cent ferro-silicon is scarce for both nearby and first quarter deliveries and prices have advanced, now being quoted $110 to $112, Pittsburg, and imported 12 per cent, $36.50.

Structural Material. — The inquiry during the past week or ten days has improved considerably and indications are that the slackness which has existed for the past two or three months is about over, the new business, covering a fair range of sizes, although the larger shapes predominate, being for early spring deliveries. The lack of new structural business for the mills has to a great extent helped out other finished lines, inasmuch as steel usually taken by structural mills has been diverted to other lines, easing up their condition from an output standpoint to no small degree. Deliveries on structural material are now practically prompt. Mills view the lack of business in this line more as a relief from the tremendous pressure than with regret, and the improvement in the number of orders is taken as an indication that the advance in steel bar prices has led users of structural to anticipate similar action in their line, but as far as can be learned there is no immediate prospect of an advance. We quote as follows:

Beams and channels, 15-inch, and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches inclusive 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Hoops and Bands.—The large tonnages placed prior to the recent advance evidently covered for requirements for some time, as teh new business, while it is fair, is not heavy, although specifications are very good. We quote as follows:

Hoops, in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Plates.—The leading interests have not made any official announcement of an advance in plates, but it is doubtful whether they would accept further business on the 1.60c base, being practically sold full to July 1, of next year. Following the advance of $2.00 by eastern mills, other plate makers have advanced their prices, and are now quoting 1.70c Pittsburg. New business is good for mills in a position to accept it, and specifications are record breakers. All efforts are being made to get the tonnage through the mills. We quote as follows: Tank plates ¼-inch thick, 6¼ to 100 inches, 1.70c, f. o. b. mill Pittsburg. Light plate schedule, No. 10, 1.80c; Nos. 11 and 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 2c. Extras on the regular plate schedule are as follows per 100 pounds: boiler and flange steel plates 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not be-

ing less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼-inch to and including 3-16-inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Merchant Pipe. — The volume of business continues unabated and while individual contracts have not been large, the small tonnages have brought the total up to nice figures. As far as can be learned the Bramah pipe line for India has not been closed, transactions being in Glasgow. Prices are very firm and deliveries two to three months. We quote the following official discounts for consumers' carloads, jobbers' discounts being 79 basing, base sizes, and 5.

⅛ to ¼ inch	60	53	65.5	49.5
⅜ inch	71	57	65 5	49.5
½ inch	73	61	68.5	57.5
¾ to 6 inches	77	67	73 5	63.5
7 to 12 inches	72	57	69	54
EXTRA STRONG PLAIN ENDS.				
⅛ to ¾ inch	62	50	58.5	46.5
⅜ to 4 inches	69	57	65.5	53.5
4¼ to 8 inches	65	53	61.5	48 5
Double extra strong plain ends, ¼ to 8 inches	53	47	53.5	42.5

Boiler Tubes.—All makers of boiler tubes are receiving very satisfactory new business, inquiries are good and prices very firm. The fact that approximately 2,000 locomotives have been ordered by railroads of the country has made this particular branch of the business strong and tube mills are very active. We quote:

Boiler tubes.	Steel	Iron
1 to 1¼ inches	50	45
1⅜ to 2¼ inches	62	48
2½ inches	64	50
2¾ to 5 inches	70	57
6 to 13 inches	62	46

Less than carloads two points less.
2½ inches and smaller, over 18 feet, 10 per cent, net, extra.
2¾ inches and larger, over 22 feet, 10 per cent, net, extra.

Old Material.—Prices, as far as dealers are concerned have advanced during the past week, but aside from one transaction of 14,000 tons of heavy melting for first quarter delivery at $19.50, delivered, outside of the Pittsburg district, no large transactions have been put through. Dealers are paying fairly high prices, but the majority of consumers seem to be comfortable and in no hurry to close at present prices. One large consumer is in the market, but has refused to pay more than $17.50 delivered for heavy melting scrap. We quote as follows: Heavy melting scrap, $19 to $19.50; rerolling rails, $21 to $22; bundled sheet scrap, $16 to $16.50; iron car axles, $29.50 to $30.50; old car wheels, $21.50 to $22; old iron rails, $25 to $26; No. 1 wrought scrap, $21 to $21.50; low phosphorus scrap, $22 to $22.50; machine shop turnings, $14.25 to $14.75; axle turnings, $16 to $16.50; cast borings, $12 to $12.50; No. 1 cast scrap, $19.25 to $19.75.

Coke. — The inquiry for spot and first half deliveries is strong and good for coke for the entire year, although many consumers have covered for their requirements. The new furnaces to be blown in during the coming year will take up practically all the surplus and probably create some shortage and probably higher prices, but the situation in this direction is not at this time viewed with any alarm by either producer or consumer. New operations in the region have not kept pace with the demand, but an unusually large number of new projects are now being considered. Standard Connellsville furnace coke is quoted $3.35 to $3.50 for spot shipment and the first six months of next year, and for the whole of next year $3.10 to $3.25, ovens. Standard Connellsville foundry coke is quoted $3.85 to $4 on contract and $4 to $4.25 for shipment prior to April 1. Some business has been done on the basis of $4.50, ovens, on foundry coke.

CHICAGO.

Important Purchase of Foreign Iron. —Heavy Specifications at Mills.

Office of THE IRON TRADE REVIEW. }
1362 MONADNOCK BLOCK, NOV. 27 }

The significance of the purchase of a cargo of foreign foundry iron by the International Harvester Co. and of the negotiations now going on for further shipments from the same source, referred to elsewhere in this report, lies beyond present conditions. Harrassed beyond endurance by the failure to secure their contract quotas in the months specified and being constantly on the verge of shutting down by reason of this delinquency, the company has turned to foreign markets for relief. Importation has been contemplated on several occasions in the past when conditions prevailed such as now exist; and with an advantage of several dollars a ton in favor of the foreign iron on the basis of the present domestic market, the suggestion is made that the practice may be continued should the experiment prove successful from a melting standpoint.

Specifications for finished material on local mills are again overtaking output. They are particularly heavy for steel bars and plates. Higher prices are asked for the latter product since the advance in steel bars, the increase generally being $2 a ton. Only one manufacturer, however, has officially advanced its schedule this amount. Toe calk and spring steel have also been advanced $2 a ton each. There is a good demand for forging billets and for prompt shipment attractive prices are offered.

Bar iron has strengthened and is selling at a minimum of 1.60c Pittsburg. The Great Northern railway has let its order for 5,000 tons of cast iron pipe, the leading interest receiving the contract. Scrap has a tendency towards higher levels. Demand is good. Car wheels have been advanced $1 a ton.

Pig Iron.—The predominate feature of the market this week is the purchase made by the International Harvester Co. of 3,500 tons of Scotch and English irons for December delivery. The metal will be shipped via New Orleans and will be used exclusively in the manufacture of export machinery. With the drawback privilege which will be allowed on the cargo, the net delivered cost per ton to the purchaser is said to be several dollars below Birmingham or valley prices.

The present iron is a low phosphorus foundry grade, and the bulk of it will be supplied from the Glengarnock furnaces. The company is negotiating with the same makers for further shipments and the possibility is intimated that hereafter foreign iron may be used more or less freely hereafter in the manufacture of machinery for export. Shipments on the Harvester company's contracts have been very irregular since the upward movement commenced, one producer being 19,000 tons behind, and owing to the ease with which spot iron can be purchased at famine prices, the company is not reconciled to the excuse that the delay is caused wholly by a shortage of cars. Another producer with whom the company has a contract has not made a delivery in five months. The only noticeable change in local conditions is an increased demand for first and second quarter requirements. One inquiry is for 15,000 tons of foundry and malleable, another for 5,000 tons of basic, and several for 1,000 and 2,000-ton lots. The largest order placed, however, was for 2,000 tons of malleable Bessemer for December shipment, the price being $26 Chicago. Southern iron for second quarter delivery has advanced 50 cents a ton, or to $19.50 Birmingham.

First quarter sales are still held on the basis of $21 Birmingham for No. 2 foundry. Spot iron averages $2 to $4 a ton higher. Northern producers are taking more of the current business, being under less obligations for the first half than southern stacks. We have revised our prices, and quote for the first quarter only as follows:

Lake Superior charcoal	$26.00 to 26 50
Northern Foundry No. 1	26.00 to 26.50
Northern Foundry No. 2	25.50 to 26.00
Northern Foundry No. 3	25.00 to 25.50
Northern Scotch Foundry	26.00 to 26.50
Ohio Strong Softeners No. 1	26 30
Ohio Strong Softeners No. 2	25.80
Southern Foundry No. 1	25.40 to 25.90
Southern Foundry No. 2	24 90 to 25.40
Southern Foundry No. 3	24.40 to 24.90
Southern Foundry No. 4	23.90 to 24 40
Southern No. 1 Soft	25.40 to 25 90
Southern No. 2 Soft	24.90 to 25.40
Southern Gray Forge	23.90 to 24.40
Southern Mottled	23 40 to 23.90
Southern Silveries (4 per cent to 6 per cent Silicon	27.40 to 29.90
Jackson Co. Silveries, 8 to 10 per cent Silicon	31.40 to 33.40
Malleable Bessemer	25 50 to 26.00
Standard Bessemer	25.50 to 26.00

Billets. — The crude steel situation in this market is without change. Demand continues to exceed supply. Axle and forging billets are in the most urgent demand and it is necessary every week for local mills to turn down business because of their inability to make deliveries. The largest sale was made by an eastern Pennsylvania company and was for 700 tons of forging-billets. Wire rods are without change at $35 Pittsburg for either open-hearth or Bessemer. Demand is insistent. Forging billets are quoted from $36 to $37 Chicago, according to delivery.

Iron and Steel Bars. — The car scarcity in the Pittsburg and Youngstown districts has assumed proportions of such a grave nature that some of the large mills in those places have advised their agents and customers to be prepared for prolonged delays to shipments, if not a possible shut-down of the plants. Their warehouses are crowded to overflowing with stocks and mills have been forced to suspend the regular rolling schedule for one that is governed entirely by the car supply. This condition of the steel bar interests, coupled with last week's advance, has brought out a voluminous quantity of specifications, and because of the uncertainty regarding deliveries not a few consumers have asked that bar iron be diverted on their contracts. Bar iron is perceptibly stronger in the local market, and 1.60c Pittsburg is the absolute minimum price quoted. New tonnage is active and some large lots are in negotiation. We quote carload lots, mill shipments, as follows:

Soft steel bars and bands, 1.76½c, half extras; soft steel angles, less than 3 x 3, 1.86½c; hoops, 2.16½c base, full extras; old rail stock, 1.70c. We quote bar iron from stock, 2.20c; full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.85 to $1.95 half extras; soft steel hoops, 2.40c to 2.50c full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Sheets.—Local jobbers have great difficulty in keeping their stocks replenished by reason of the crowded nature of mill order books. Eight to ten weeks is the best shipment that can be made by producers on either black or galvanized sizes, and this delay has resulted in some depreciation of the volume of business. The movement from warehouse stocks, however, is very active. Prices are firmly maintained.

We quote as follows:

Black sheets, Nos. 8, 9 and 10, 1.85c Pittsburg; No. 28 gauge, 2.60c Pittsburg. Galvanized sheets No. 28 gauge 3.65c Pittsburg. Freight to Chicago 16½c per 100 pounds. Jobbers' prices on less than carload lots from store are as follows: Black sheets, No. 10, 2.20c to 2.30c; No. 12, 2.25c to 2.35c; No. 14, 2.30c to 2.40c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.70c to 2.80c; Nos. 22-24, 2.75c to 2.85c; No. 26, 2.80c to 2.90c; No. 27 2.85c to 2.95c; No. 28, 2.95c to 3.05c; No. 30, 3.35c. Galvanized sheets, Nos. 10 to 20, 3.25c to 3.35c; Nos. 22 and 24, 3.40c to 3.45c; No. 26, 3.60c to 3.70c; No. 27, 3.80c to 3.90c; No. 28, 4c to 4.10c; No. 30, 5.20c to 5.30c.

Plates.—As was expected, the advance in steel bars has resulted in a higher market on plates. The Cambria Steel Co. has raised its schedule $2 a ton, and while no other companies have officially announced a change, 1.70c Pittsburg is being asked by practically all the other independent companies. The Steel Corporation expects to follow suit at an early date. Specifications for both universal and sheared plates are active, and on new business the earliest delivery that mills can give is ten to twelve weeks. There are few producers that have not sold their output for the first half of 1907, while several interests, conspicuous among them being the Steel Corporation, have the bulk of their output for the whole year under contract. Prices are very firm, and there is talk of an advance on store shipments. We quote as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.60c to 1.70c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago is 16½c per hundred pounds.

Jobbers' prices for shipment from local stocks are as follows: Tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches up to 96 inches wide, 2.10c to 2.20c; 3-10 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch, 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Rails and Track Supplies. — The movement in light rails and track supplies continues very active. On spikes, the leading western interest has withdrawn from the market, and has very little to offer of either bolts, nuts or splice bars for the first half of 1907. It is likewise heavily obligated for the same period on light rails. New tonnage for standard sections is confined to small orders for interurban roads; the largest transaction pending is for 12,000 tons from an Ohio traction interest. We quote as follows:

Bessemer rails, $28; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $32; 25-pound, $33; 20-pound, $34; 16-pound, $35; 12-pound, $36, and lighter sections down to 8-pound, $42.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. Angle bars in large lots are quoted 1.50c to 1.75c; for smaller quantities, 2.25c to 2.75c; spikes, large lots, 2.10c to 2.25c; for smaller quantities, 2.50c; bolts, large lots, 2.65c to 2.75c; smaller lots, 2.85c with square nuts, and 3c with hexagon nuts.

Structural Steel. — Contracts continue to be placed for deliveries in 1907 and mills are rapidly selling their output for that year. Specifications for current shipments show an improvement, but they are not yet up to the rolling capacity of this district. The largest inquiry is from car builders, who are securing prices for the material required in the construction of 20,000 cars. Prices are without change, as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base; beams, three inches to 15 inches, inclusive, $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base.

Merchant Steel. — Specifications pour in from week to week without any appreciable diminution. New tonnage is light because of the inability of makers to guarantee any delivery. Shipments are fairly prompt considering the car scarcity and steel shortage. Toe calk and spring steel were each advanced $2 a ton last Saturday. We quote as follows:

Planished or smooth finished tire steel, 1.96½c; iron finish, up to 1½ x ½ inch, 1.91½c; iron finish, 1½ x ½ inch and larger, 1.76½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.26½c, and 1⅛ inch and larger, 2.16½c; smooth finished machinery steel, 2.01½c; flat sleigh shoe, 1.81½c; concave and convex sleigh shoe, 2.06½c; cutter shoe, 2.35c; toe calk steel, 2.31½c; railway spring, 1.96½c; crucible tool steel, 6½c to 8c, with higher prices asked on special grades. Shafting is very strong and an advance is expected. Quotations are without change at 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Merchant Pipe.—Despite the fact that ordinarily this is a dull season, the open weather that prevails in the western districts has resulted in a volume of specifications very satisfactory to the producing interests. Prices are firmly maintained on the following basis: Chicago discounts, car lots, ¾ to six-inch black steel pipe, 77.35; galvanized, 67.35. From store in small lots, Chicago jobbers are asking 74½ to 75 per cent discount on the base sizes.

Cast Iron Pipe.—The Great Northern railway last week let a contract for 5,000 tons of culvert and water pipe to the United States Cast Iron Pipe & Foundry Co., for deliveries extending through the greater part of 1907. There is considerable inquiry for gas and water pipe, but aside from the foregoing no important transactions have been closed in the week under review. Prices are firm as follows: Four-inch water pipe, $36; six, eight, ten and 12-inch $34.50; larger sizes, $34; gas pipe, $1 a ton higher.

Wire Products.—The insistent tone of the market announced in previous reports continues without diminution. The total sales for November are expected to equal those of October, and will greatly excel those for the same month of last year. All the plants of the leading interest are operating at full capacity. The car shortage has not lessened in severity, and is the only cloud on the horizon. Deliveries are slow as a result of it. Prices are firmly maintained on the new basis. We quote local prices to jobbers as follows: Wire nails, $2.05; painted barbed wire, $2.20; galvanized barbed wire, $2.50; smooth annealed wire, $2.20; polished staples, $2.20; galvanized staples, $2.45. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—The demand for foundry coke both for spot and forward deliveries, is very active. Little, if any Connellsville or by-product fuel can be had for either shipment, and local melters are forced to turn to West Virginia ovens for relief. This is offered on the same basis as Connellsville, viz., $4 ovens, or $6.25 Chicago.

Old Material.—The local market continues very firm. Trading is restricted in volume because of the high prices asked. Dealers are not inclined to recede from their position, anticipating still higher prices with the first heavy snow or frost. Cast scrap is in the most active demand, and this is moving freely. Car wheels have advanced $1 a ton, and are now quoted $24. Old iron rails are scarce enough to make an open market; almost any reasonable price can be obtained for them. The only new list out is that of the "Omaha" road for 1,200 tons. We quote as follows, gross tons being given in the first paragraph.

Old Steel Rails (4 feet and over)	$20.50 to 21 00
Old Steel Rails (less than 4 feet)	19.50 to 20 00
Old Car Wheels	24.00 to 24.50
Old Iron Rails	28.00 to 28.50
Relaying Rails, subject to inspection	29.00 to 30.00
Frogs, Switches and Guards	18.50 to 19.00
Heavy Melting Steel	17.50 to 18.00
Mixed Country Steel	15.00 to 15.50

We quote net tons, as follows:

No. 1 R. R. Wrought	$18.00 to 18.50
No. 2 R. R. Wrought	17.00 to 17.50
Shafting	19.00 to 19.50
Dealers' Forge No. 1	13.50 to 14.00
Wrought Pipe and Flues	12.00 to 13.50
No. 1 Cast, 150 pounds and less	17.50 to 18.00
No. 1 Mill	10.50 to 11.00
Mixed Busheling (No. 1 & No. 2)	13.00 to 13.50
Country Sheet	9.00 to 9.10
No. 1 Boilers Cut	12.50 to 13.00
Boiler Punchings	16.00 to 16.50
Iron Car Axles	26 50 to 27 00
Steel Car Axles	23.00 to 23.50
Iron Axle Turnings	11.00 to 11.50
Cast Borings	9.00 to 9.50
Mixed Borings, etc.	9 00 to 9 50
Machine Shop Turnings	11.00 to 11.50
Railroad Malleable	18.00 to 18.50
Agricultural Malleable	17.00 to 17.50
Stove Plate and Light Cast Scrap	14.00 to 14.50
Old Iron Splice Bars	22.00 to 22.50

Boiler Tubes.—The demand for tubes shows no indications of diminishing; and because of the delayed shipments by mills, jobbers are having some difficulty in maintaining an assortment of sizes in their stocks. Prices are very firm but without change. We quote as follows: 2¾ to five inches, steel 68.35; iron, 55.35; seamless, 2¾ to 4½, 50.85. Less than carload lots from store, base sizes, are 60 off for steel; 47½ for iron, and 42½ for seamless tubes.

CLEVELAND.

Cold Weather Interferes With Ore Shipments.—Iron Selling for Second Half.

Office of The Iron Trade Review.
Browning Building, Nov. 28

Iron Ore. — The extremely cold weather of the past week on the iron ranges has reduced the ore movement to a minimum and has practically brought about the end of shipments for the season. Because of the frozen condition of the ore, the loading of vessels has been very slow and this, in connection with the heavy gales sweeping over Lake Superior, has resulted in large fleets being assembled at upper lake ports. The prediction is made that, because of these difficulties, the total movement from Nov. 1 to the close of navigation will be smaller than during the corresponding period last season, when it was only about 3,750,000 tons. On this basis the movement by water for the year will be about 37,000,000 tons, or 3,500,000 tons more than in 1905. The scarcity of cars is interfering seriously with the movement from Lake Erie docks, but it is not believed that the amount on dock at the close of navigation will fall far short of furnace requirements through the winter. The large ore producers have not yet taken up the subject of chartering for 1907, but a number of smaller interests have engaged considerable tonnage at the same rates as prevailed during the season just ended. An occasional inquiry for ore develops, with very little to be had. Based on the reduced iron content recently established, prices for next season are quoted as follows: Old Range Bessemer, $5.00; Mesabi Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.00. For comparative purposes, 1907 rates, as figured on the iron content heretofore maintained, are as follows: Old Range Bessemer, $5.15; Mesabi Bessemer, $4.90; Old Range non-Bessemer, $4.30; Mesabi non-Bessemer, $4.10.

Pig Iron.—The feature of the market during the past week has been the very considerable selling of foundry iron for delivery during the second half on the basis of $21.50 to $21.75, delivered Cleveland. A small lot of spot iron sells now and then at $25 for No. 2 foundry, with first quarter iron obtainable at the same figure and second quarter at $23 for No. 2 in Cleveland. The scarcity of cars is becoming a more important factor every week. Northern furnaces are suffering severely, but the situation is ap-

parently more acute in the south, where one interest, reported to be 20,000 tons behind on deliveries, has enough iron on its yards to square accounts if the car and motive power supply were adequate. We quote first half delivery, f. o. b. Cleveland:

Bessemer	$21.85 to 22.85
No. 1 Foundry	22.50 to 23.50
No. 2 Foundry	22.00 to 23.00
No. 3 Foundry	21.00 to 22.00
No. 2 Southern	22.00 to 22.50
Gray Forge	21.00 to 21.00
Gray Forge, Southern	18.00 to 18.50
Lake Superior charcoal	25.00 to 26.00

Coke.—It is practically impossible to secure box cars, and foundries are consequently having much difficulty in handling their coke supplies. Foundry coke is quoted at $3.25 to $3.50 for the first half of next year with slight shading possible on contracts running throughout the year. Foundry coke is quoted at $4 to $4.50 ovens, according to the make.

Finished Materials.—In accordance with the current readjustment of finished material prices to the advanced cost of raw materials, two leading independent interests have announced an advance of $2 per ton in plates, placing them on the basis of 1.70c Pittsburg. An independent interest, which has recently made two advances, has just announced a third, making its price 1.90c Pittsburg, at which deliveries inside of 30 days are procurable. In other lines prices are unchanged, and no advance is in prospect if current rumors of higher prices on sheets are expected. The volume of business is noticeably heavier than a month ago and specifications are extremely large. Both iron and steel bars out of jobbers' stock are selling at 1.95c Cleveland.

Old Materials.—The scarcity of pig iron largely explains the heavy demand for cast iron scrap which has become a feature of the market, prices having advanced $1 per ton during the week. Activity is noted in other lines and the trend of the entire market is upward. We quote Cleveland delivery, gross tons in the first paragraph, as follows:

Old iron rails	$27.00 to 27.50
Old steel rails (over 6 feet)	20.00 to 20.50
Old steel rails (under 6 feet)	19.00 to 20.00
Old car wheels	20.50 to 21.00
Steel boiler plate	16.00 to 16.50
Steel axles	22.00 to 23.00
Malleable iron (railroad)	19.00 to 19.50
Malleable iron (agricultural)	15.50 to 16.00
Heavy steel	17.75 to 18.25
Country mixed steel	15.50 to 16.00

We quote net tons as follows:

No. 1 R. R. wrought	$18.50 to 19.00
No. 1 busheling	15.50 to 16.00
No. 1 machine cast	19.50 to 20.00
Iron axles	26.00 to 27.00
Axle turnings	13.50 to 14.00
Wrought turnings (free from cast)	12.00 to 12.50
Grate bars	14.50 to 15.00
Pipes and flues	15.00 to 15.50
Tank iron	12.50 to 13.00
Hoop and band iron	9.00 to 9.50
Sheet iron	9.00 to 9.50
Wrought drillings	12.00 to 12.50
Stove plate	14.50 to 15.00
Cast borings	9.50 to 10.00

CINCINNATI.

More Interest in Buying for Last Half.—Inducements Offered.

November 27.

Pig Iron.—There has been slightly more interest in forward delivery iron the past week. Buyers show more inclination to cover for second quarter and sales extending into and through the last half of the year are more frequent. Some furnace interests are reported to be urging their selling agencies to place business in the last half of the year when possible. Southern iron for the last half has sold at $17.50 Birmingham, and in some instances part of the second quarter has been included at this price to induce the order. Northern iron for last half is quotable at about $20.00 at furnace, but transactions are not made public as yet.

Spot iron is easier in tone and more freely offered and there is not enough demand to absorb it readily. Some round lots of spot iron have been disposed of to large melters to clean it up, but such sales do not reflect much, if any, sacrifice in the price. The general trade is not inquiring for prompt iron nearly so urgently as two weeks ago. The quotation is still $22.00 Birmingham on southern iron and $24.00 to $25.00 at furnace for northern.

There is practically no northern iron offered for first quarter and a limited amount of southern iron is selling at around $20.00 Birmingham.

Second quarter southern iron is still obtainable at $18.00 Birmingham, but the general asking price is $18.50 and some are holding for $19.00. Northern iron is quoted at $21.00 at southern Ohio furnace for second quarter.

There has been no improvement in getting iron forward on contracts and foundries are urging everything forward that is due to them, but the scarcity of cars is putting practically all of the southern furnaces behind on deliveries, causing great annoyance to all concerned.

The general tone of the market indicates that buyers and sellers are in a mood to believe that prices are at or near the top, and as this becomes more widespread a quieter market is to be looked for. No immediate change in values to a lower basis is, however, expected in any quarter. We quote for first quarter delivery, f. o. b. Cincinnati, as follows:

Southern Foundry No. 1	$23.50 to 24.50
Southern Foundry No. 2	23.00 to 24.00
Southern Foundry No. 3	22.50 to 23.50
Southern Foundry No. 4	22.00 to 23.00
Southern Foundry No. 1, soft	23.50 to 24.50
Southern Foundry No. 2, soft	23.00 to 24.00
Gray Forge	21.50 to 22.00
Northern Foundry No. 1	24.65 to 25.65
Northern Foundry No. 2	24.15 to 25.15
Northern Foundry No. 3	23.65 to 24.65
Jackson County Silvery, 8 per cent	27.15
Southern Charcoal	26.00 to 27.00

Coke.—The car scarcity is felt acutely and consumers are urging their shipments forward without success. Some contracting for delivery in the first half of next year is being done, but the bulk of the business is in emergency coke. Prices continue to advance and we revise quotations. Prices given below reflect the market in the leading coke-producing districts:

Wise County, Va. Furnace Coke prompt shipment	$3.50 to 3.75 per ton
Wise County, Va. Foundry Coke	4.00 to 4.50 per ton
Pocahontas Furnace Coke prompt shipment	3.25 to 3.50 per ton
Pocahontas Foundry Coke	3.50 to 4.00 per ton
Connellsville Furnace Coke prompt shipment	3.15 to 3.50 per ton
Connellsville Foundry Coke	4.15 to 4.50 per ton
New River Foundry Coke on contracts	3.50 to 4.00 per ton
New River Furnace Coke, prompt shipment	2.75 to 3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.70 to $1.75 per ton on $9.00 pig iron, plus 19 to 20 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market continues firm with an advancing tendency. Consumers are using scrap more freely in place of pig iron. We quote, f. o. b. Cincinnati, as follows:

Old No. 1 railroad wrought, net tons	$18.50 to 19.00
Cast machine and foundry, net tons	18.00 to 18.50
Old iron rails, gross tons	26.00 to 27.00
Old steel rails, gross tons	19.00 to 20.00
Old short lengths, gross tons	19.00 to 20.00
Old iron axles, net tons	26.00 to 27.00
Heavy melting scrap, gross ton	20.00 to 21.00
Stove plate, net tons	13.50 to 14.00
Wrought turnings, net tons	11.50 to 12.00
Cast borings, net tons	9.00 to 9.50
Car wheels, gross tons	19.00 to 19.50

NEW YORK.

Pig Iron Situation Still Strained.—Some Selling for Third Quarter at High Prices.

Office of THE IRON TRADE REVIEW.
ROOM 1315, No. 150 NASSAU ST., Nov 28

Pig Iron.—The most important development of the week has been liberal buying of third quarter iron. Sales have been at high prices for the second half of the year, which seems to argue well for continued high quotations during the year. There have been a number of sales for delivery in July, August and September at slightly above $24 at the furnace, and negotiations for a large block are now going forward upon the basis of $23, New York, asked price.

Available lots for prompt shipment are eagerly taken, and foreign iron is being used to fill in gaps. Several thousand tons of English and Scotch pig have been sold for distribution from this point, but reports of transactions in imported metal have been exaggerated. Cargoes are coming in regularly, but not in such quantities as has commonly been stated.

Transportation difficulties are still the chief cause of the urgent demand for foundry pig. Many foundries are still running on the hand-to-mouth plan, but actual shut-downs are few. One melter in this neighborhood was on one day last week without a pound of pig in his yard, his cupolas being put on an exclusively scrap diet for the space of twelve hours. But most melters are not in immediate danger, and the pressure on the market is sustained to a considerable degree by foundrymen who are anxious to accumulate a reserve supply. It is needless to say that if this demand continues, it will devour all possible surplus for some time to come.

The patience of consumers in the matter of delayed shipments is remarkable. Melters who have abundant supplies of $13 iron to their credit, but are unable to realize, cheerfully accept hard luck stories about the lack of cars and purchase anew for pressing needs. One hears of not a single suit for damages. Everybody seems to recognize the difficulties under which the furnaces are laboring. Insufficient labor, irregular supplies of raw materials and adverse weather conditions have all helped to reduce the output of standard grades. To add to the trouble many of the stacks have been running for months under abnormal pressure, and are proving unequal to the strain. One furnace in the south has been forced to blow out for relining, leaving a debt of thousands of tons due consumers.

Prices have not changed materially during the week. Sales of spot lots have been made at figures ranging from $24 to $27.50 according to the needs of the purchaser. Practically all the foreign metal that arrives is immediately distributed to waiting consumers. The extraordinary demand from this side has sent the English and Scotch market up sharply, today's quotations from London being 59s 9d for standard warrants, and 60s 6d for Cleveland.

The following are prices of pig iron for forward delivery at tidewater:

Northern Foundry No. 1	$23.50 to 25.00
No. 2 Foundry	23.00 to 24.00
No. 2 Plain	22.50 to 24.00
No. 1 Southern Foundry	23.00 to 24.00
No. 2 Southern Foundry	22.50 to 24.00
No. 3 Southern Foundry	21.00 to 22.00
No. 4 Foundry	20.00 to 21.00

Certificates and Standard Contracts.—The market for pig iron paper on the New York Produce Exchange has been quiet but firm. There were no sales of importance. The following are quotations for standard foundry iron contracts:

	Bid.	Asked.
November	....	....
December	....	....
January	21.50	23.00
February	21.50	23.00
March	22.00	23.00

Finished Iron and Steel.—The trade is at present experiencing a lull in all forms of finished products. New business in rails and structural shapes has been no more plentiful than last week and the activity in plate, bars, sheets and wire has also fallen off. No one is, however, in the least alarmed. Although the tonnage on the books may be less than it was a few months ago, every mill is working at increased capacity and the increased output is reaching the market. An opinion one frequently hears expressed is that producers have become accustomed to work on orders extending too far into the future. A considerable shortening of the gap between order and delivery will do no harm.

Actual orders for structural materials have been few, the only one of importance which appeared during the week being one for 300 tons of steel for the Consolidated Exchange building, which went to the American Bridge Co. Several steel mills and industrial plants will require considerable tonnages for extensions, otherwise very little is in sight either in the form of large building operations or railroad bridge work. The extensive construction authorized last week by New York city for the improvement of bridge traffic to Brooklyn will consume many thousand tons of steel, and although bids are not yet ready, it is said that the work is to begin at once.

Sales of rails have been confined to 500 and 1,000-ton lots of miscellaneous character, but negotiations are on foot for several round lots. An unusual number of trunk lines are increasing their tonnages for 1907. The fear of the producers is not that their order books will not be filled but that some belated customers may not be able to find the space necessary for his needs. Reports have been going the rounds of the newspapers regarding a supposititious determination on the part of the railroads to curtail their expenditures for the coming year by reason of the increasing wage scale and enhanced cost of supplies. A steel man closely in touch with transportation matters points out that all the railroads are overwhelmed with business, most of them are short of power and rolling stock, and not a few are hampered by imperfect track arrangements. As long as these conditions obtain, he says, it is not necessary to take these reports seriously.

The following are prices at tidewater: Angles 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.74½c to 1.84½c; sheets, No. 28 black, 2.60c.

Old Materials.—The scrap market is in a curious state of erratic activity. Prices are irregular and the demand is constantly shifting from this line to that. Cast scrap has been sold for $20 per ton, old car wheels at $23, and $19, delivered in eastern Pennsylvania, has been demanded for heavy melting steel. The demand for wrought scrap which has been most neglected of late, shows a decided improvement, some good sales being reported. The available stock of cast scrap in this vicinity is about cleaned up and supplies of all other kinds are greatly reduced. There is even talk of importations from Europe of varieties most in demand. Among the sales reported in the local market during the week were 200 tons of stove plate and 400 tons of heavy melting steel. The following are prices approximately f. o. b. tidewater:

Old iron rails	$25.00 to 25.50
Old steel rails, long lengths	16.50 to 17.00
Old steel rails, short pieces	15.50 to 16.00
Relaying rails	25.00 to 26.00
Old car wheels	21.00 to 23.00
Old iron car axles	29.00 to 30.00
Old steel car axles	21.00 to 21.50
Heavy melting steel scrap	16.00 to 18.00
No. 1 railroad wrought scrap	20.00 to 20.50
Iron track scrap	18.00 to 19.00
Wrought pipe	14.00 to 14.50
Cast borings	11.00 to 11.50
Wrought turnings	12.50 to 13.75
Heavy Cast Scrap	17.50 to 20.40

PHILADELPHIA.

Demand Strong, But Pig Iron Buying Beyond July is Not Lively.

November 27.

Pig Iron.—Notwithstanding the increased production of the furnaces and the importation of foreign iron, of which several cargoes additional are on their way here, the demands of consumers show neither cessation nor diminution and the market becomes daily more difficult to report with any degree of accuracy. Where producers will give quotations at all these are of three varieties, differing considerably in amounts—for spot iron, first half of 1907 and second half. No. 2 X foundry for prompt shipment, which it is now almost impossible to secure except in diminutive quantities, readily brings $27 and $28 a ton, and for the first half of next year sales are being made at $25.50. For the second half a considerable concession is made, but neither furnace men nor consumers are as yet

willing to make any very large commitments beyond July 1. That the demands of consumers are based upon actual needs, and not upon imaginary fears as to the future, is shown by the reports that come in of establishments compelled to close for lack of supplies. Such stoppages are generally very brief, for a day, or two or three days, until a carload or two of pig iron can be rushed to them, but they are interesting as reflecting the condition in which buyers are facing winter, with its inevitable delays in transportation. So far the weather has been extremely favorable to both producers and consumers, and the chief complaints of car shortage come from the south, from which it is rarely possible to get shipments of pig iron to this market in less than a month. Nearly all the Middlesborough and Scotch iron due here up to Jan. 1 has already been sold, and reports of rapidly advancing prices on the other side indicate that this source of relief will soon be cut off. Scotch iron is now bringing No. 2X at dock, Middlesborough No. 1, $22.50 and No. 3 $22. Eliminating spot prices, in which premiums of $1 and $2 are asked, quotations for the first half of 1907 may be given about as follows, the range being unusually wide because of the special conditions under which many sales are made:

No. 1X Foundry	$25.50 to 26.50
No. 2X Foundry	24.50 to 25.50
No. 2 Plain	24.00 to 24.50
Standard Gray Forge	21.75 to 22.50
Basic	22.50 to 23.00
Low Phosphorus	27.00 to 28.00

BUFFALO.

Decided Shortage in Pig Iron.—Ore Supply Also Inadequate.

November 28.

Much anxiety prevails in Buffalo over the pig iron situation owing to the famine which has come upon this district. It is many years since the shortage of pig iron was so pronounced. Local furnaces are working at full capacity, but unless there is stronger evidence that ore for future delivery is to be more plentiful, it will be a long time before conditions at Buffalo will be normal again. The foundry managers are apathetic about the situation, as they cannot see future business properly cared for under existing conditions and their efforts to clarify matters so far have not produced results.

With domestic iron a scarcity, prices are naturally uneasy and vary considerably from one day to another. The situation has drifted toward its present crisis here during the past few weeks and prices of iron have constantly grown more restless. Prompt delivery in most cases is out of the question. Furnaces have little or none to sell now, although working strenuously to fill orders on hand. Spot delivery prices on the pig iron product, which are practically the same here now as first quarter delivery, run from $25 to $26 a ton. Second quarter delivery prices run about $1 less when iron is on hand. Last half prices are really the only other quotations just now and they fluctuate between $21 and $22 a ton.

There is little ore coming down the lakes to Buffalo except cargoes contracted for long ago by the big furnaces, which are smelting ore about as fast as it comes in. These furnaces are guessing where future ore is coming from, meanwhile they are making the best of the situation.

ST. LOUIS.

Conditions Somewhat Easier, but Prices are Firm.

November 26.

On the whole, conditions are somewhat easier in the local market for pig iron than they were a week ago, but prices continue firm without any immediate prospect of a decline. Nearly all of the large melters are covered for the next four months and the chief difficulty today is in getting the iron. Furnaces are catching up somewhat on deliveries, many of them refusing to book any orders until they are in better position to handle the business.

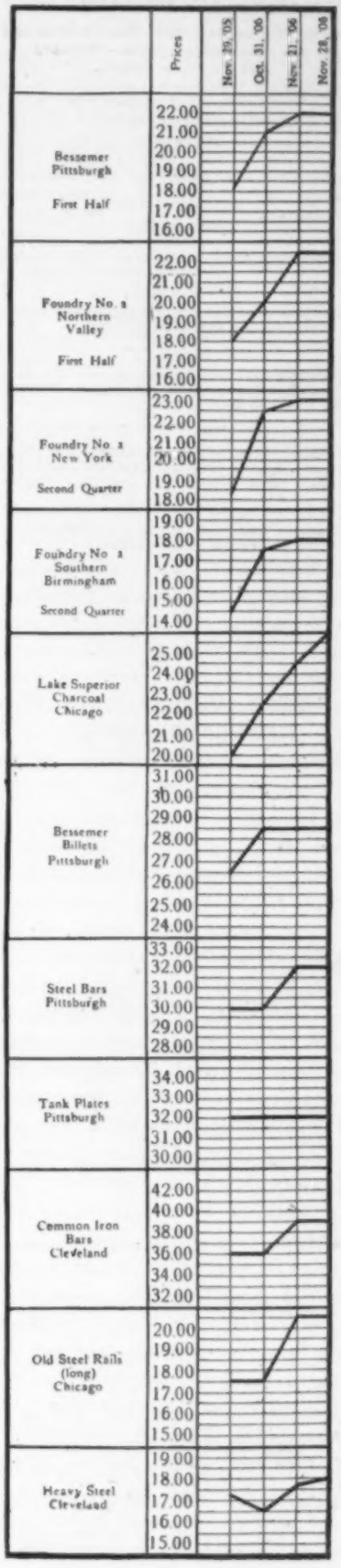
Inquiries for the last half of next year have begun to appear in the local market. One agent who submitted them to his furnaces reports that they refused to make him any quotations. This same agent is delivering iron today sold more than a year ago at $11 a ton, Birmingham. It is evident his clients do not want to get stuck again.

Business for the second quarter is tolerably brisk, but it was confined to small lots this week. Spot continues to attract most attention. The price ranges from $23 to $23.50. Some higher prices are rumored, but not verified, for iron on track. Twenty dollars is the quotation for the first quarter and $19 for the first half.

Quotations for the first quarter, including the freight rate from Birmingham, range as follows:

Southern No. 1	$24.00 to 24.50
Southern No. 2	23.50 to 24.00
Southern No. 3	23.00 to 23.50
Southern No. 4	22.50 to 23.00
Gray Forge	22.00 to 22.50

PRICE CHART.



THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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November 29, 1906.

A GREAT OPPORTUNITY FOR TRADE EXPANSION.

Secretary of State Root made an epochal trip around South America, last summer, visiting fifteen different ports, and attending, in Brazil, the third convention of the Pan-American Congress. At Kansas City, last week, at the annual convention of the Trans-Mississippi Commercial Congress, he delivered a speech, outlining his observations and views with respect to our South American neighbors, and the trade possibilities between them and us, that for breadth and completeness has never been excelled by any American statesman. Secretary Root's trip was unique, and his recital of what he observed was masterly and thorough.

"Immediately before us, at exactly the right time," said Mr. Root, "just as we are ready for it, great opportunities for peaceful commercial and industrial expansion to the south are presented." He also said that "the opportunities (in South America) are so large that figures fail to convey them." Our readers are deeply interested in what Mr. Root had to say, because, in the south more than in any other geographical division of the world, the opportunities for larger markets for their special products are most promising. More than one-third of all of our steel exports to all the world went to South America, aggregating 151,545 tons, valued at $3,562,676, and there are large opportunities for a vast increase in this trade. The value of electrical appliances sent to South America from the United States last year reached $1,500,000, while electrical machinery worth $600,000 additional also went to that part of the world. In builders' hardware more than $1,750,000 worth went to South American countries, and over $300,000 worth of typewriters alone went to our sister republics on the other continent of this hemisphere from this country.

As Secretary Root pointed out, the area of South America is twice that of the United States and Alaska combined, aggregating 7,502,548 square miles, the population in 1900 being but 42,461,381. South America exports to foreign countries goods valued at $745,530,000, and imports goods from other countries valued at $499,858,600. They buy from us only 12.6 per cent, valued at $63,246,525; although we take from them 20.4 per cent of what they sell, valued at $152,092,000. More than three-quarters of all that we buy from South America comes in free of duty. Boundless resources in mines and forests, fertility of soil unparalleled and a people desirous of cultivating closer relations with the United States are what Secretary Root found. He ascertained that the great exporting nations of Europe were increasing their business with South America, and employing all of the known agencies of commerce to hold and increase their trade, while the United States is almost unknown commercially, and our flag is but rarely seen in their ports. European manufacturers send as their representatives to South American countries, men who can speak Spanish and Portuguese fluently, and we do not; Europeans establish banks of their own in South American countries, and we do not; European manufacturers make what the people of South America want, and we tell them what we think they should take from us instead of what they tell us they want; other peoples treat South Americans upon a plane of perfect equality in every respect, and we treat them with an air of superiority which they are bound to resent; other nations find profitable investment for their capital in South America, and at high rates of interest, and thus cultivate pleasant and lasting trade relations, of a most profitable character with the people of that part of the world, and we do not. Hundreds of steam ships visit the ports of South America, every year, from Europe, bringing goods and passengers, and rarely does a ship of any kind go from the United States to South America, and almost never one flying the American flag. There is no American line to any part of South America south of the Caribbean Sea, and but one small line, running to Venezuela, to all of South America under the American flag.

Secretary Root says that we must establish lines of swift American steamships, running frequently and regularly to South America, and he told the members of the Trans-Mississippi Commercial Congress that the senate has passed a bill, now in the house of representatives, that will make the needed start in the way of building up a great trade and far closer relations, of a more friendly and more profitable character, if that bill is speedily passed.

Secretary Root quoted from President Roosevelt's last annual message to congress to show how deeply impressed the president is with the need of an American merchant marine, and especially new lines to South America; he also showed from the last annual report of the postmaster general, that under existing law such lines cannot be established, and that they should be, and Secretary Root, therefore, strongly urged the passage of the pending shipping bill — that framed by the Merchant Marine Commission which was appointed at President Roosevelt's suggestion, and which framed the bill now in congress. To all of the readers of THE IRON TRADE REVIEW, to whom we have pointed out, time after time, the great

possibilities for increased trade with South America, and the need of an American merchant marine by which to increase that trade, we commend immediate action upon the suggestion contained in the following paragraph quoted from Secretary Root's great speech:

"The bill now pending in the house is a bill framed upon the report of that Merchant Marine Commission. The question whether it shall become a law depends upon your representatives in the house. You have the judgment of the postmaster general, you have the judgment of the senate, you have the judgment of the president; if you agree with these judgments and wish the bill which embodies them to become a law, say so to your representatives. Say it to them individually and directly, for it is your right to advise them and it will be their pleasure to hear from you what legislation the interests of their constituents demand."

THE IRON TRADE REVIEW most earnestly indorses and re-echoes that suggestion. We urge all of our readers, as in their own individual and collective interest, for the nation's welfare and safety, to busy themselves with their representatives in congress, by wire or letter, and at once, asking them to speak and vote for the passage of the Merchant Marine Commission's shipping bill.

FASTER FREIGHT MOVEMENT.

Dozens of manufacturers' associations, chambers of commerce and other commercial organizations have endorsed the recently started movement to compel the quicker delivery of freight. This is a time in the history of the American people when fresh views are being taken of affairs which concern the public, and the *ipse dixit* of a great corporation, whether in the insurance, railroad or manufacturing business, is not taken as a compelling finality. The loss to commerce by slow moving freight has always been more or less understood, but there has been a disposition to regard the self-interest of the railroads as a sufficient corrective influence, on the basis that where goods in transit are delayed, the car containing them is railroad property.

The present movement, being fundamentally one towards federal regulation, has met a small measure of discouragement in some quarters through the suggestion that personal conference with the railroads should be depended upon to work an improvement. The conference idea is not put forth nearly so much as it would have been a few years ago, an evidence that in this as in some other matters the American people have had an awakening. Results have shown most clearly that conferences do not bear tangible fruit. Some statistics compiled show that elapsed time on freight shipments is longer than it was three years ago. In general, the movement has been enthusiastically received wherever it has been explained. It is as yet in its infancy, relatively speaking, although it has been endorsed by more than three score commercial bodies of one kind or another. When full recognition has been obtained, a permanent organization is to be formed, and two or three years' work will, it is hoped, result in congressional enactment of a law empowering the Interstate Commerce Commission to fix maximum times for freight movement, proportionate to distance and, presumably, other considerations, and putting a discount upon freight bills for transgressions of the limit. Statistics will then be compiled showing the exact status of affairs. Meanwhile every shipper of freight knows enough by his own experience to convince him that improvement is loudly called for. He has but to divide the distances his shipments travel by the elapsed times, and then compare the quotient with the speed at which the trains travel when the freight is actually in motion.

A table compiled by Mr. T. Peyton Giles, of Richmond, Va., who with Mr. John Donnan, stands as sponsor for this movement pending the formation of a permanent organization, shows, on 40 shipments, taken at random, except that selection was made to cover a sufficient scope of country, an average elapsed time of 61.61 miles per day or 2.57 miles per hour. The distances ranged from about a hundred to over a thousand miles, and the times from a day to over a fortnight. The experience of practically all shippers will confirm the showing of this table.

An estimate has been made that the value of all railroad freight shipments in a year is about twenty billion dollars. It is also estimated that these goods are in the hands of the railroads an average of nine days. That would mean that on an average about half a billion dollars' worth of freight is in the hands of the railroads. Their own cars are worth three times as much. Making allowance for time consumed in the return of empties and delays in shippers' and consignees' yards, it is certain that the railroads have twice as much interest charge as the owners of the freight. Whether these figures are exactly correct or not, they certainly give a sufficient answer to those who hold to the conference idea. Self-interest has not moved the railroads to correct the evil charged. Either it does not exist, or some outside force must be brought to bear.

It would not be the first time for railroads to be compelled, by an outside influence, to do what is for their own good. The air brake and safety appliance requirements were opposed in their time, but ultimately the compliance became willing, and the best railroads soon came to exceed the legal requirements.

In spite of the tendency which Mr. James J. Hill sometimes shows to allow his strong feeling to lead him into exaggeration, his utterances must command respect. It is related that recently some attaches of stock exchange houses recalled that a few years ago Mr. Hill used to call at their offices, and make the most optimistic predictions regarding his railroad properties; that they made notes of some of these for amusement, but found that they all came true. When told of the incident, Mr. Hill remarked that they were doubtless sorry they had not noted the predictions for something more than amusement. Now Mr. Hill has recently said that the country needs 120,000 miles more of railroad, thereby combating the idea that the chief desideratum is more cars. He would by this means secure a quicker

movement of the existing cars and thus relieve the freight congestion. It is confessedly impossible to build the 120,000 miles of railroad in any reasonable time. Neither the money nor the men are available. If more cars will not solve the problem, and more railroad cannot be built, the only recourse is to move the present cars more promptly over the roads now in existence.

The idea of compelling railroads to do that which their own self-interest should ere this have prompted them to do is not repugnant to present thought. It may have been at one time, but it is not now, because, as said before, the public is looking at these things in a different light. It has too often been shown of late that men do not know or do not do that about their business which they ought to do. In one respect, however, the movement toward federal compulsion recommends itself on fundamental principles. A great deal of the present loss of time is due to delay at junction and transfer points, where freight must pass from one railroad to another. Through jealousy and indifference such freight is allowed to stop longer than it should. It is essentially a matter for the federal government to step in between the railroads and compel them to render proper service to each other. All shippers know that, other things being equal, more time must be counted upon where the shipment is to pass over more than one road, and the extra time is quite out of proportion to the necessities of the case.

The proposed legislation need not be drastic. There is reason to believe, that once the railroads were shaken up, they would ultimately be found doing much more than legally required of them.

The publication of the series of articles being written for THE IRON TRADE REVIEW by Mr. F. E. Webner, of Cincinnati, on "Cost Keeping" has been temporarily suspended on account of the serious illness of the author. The publication will be resumed as soon as Mr. Webner is able to take up his work again.

THE STEEL CLUB

Organized by Employes of the United States Steel Corporation in Chicago.

The employes of the thirteen constituent companies of the United States Steel Corporation, connected with the Chicago offices, have formed an organization which is known as the Steel Club. The first meeting was held Tuesday evening, Nov. 20, the occasion being celebrated with a banquet at the Auditorium Annex. At this meeting, the following officers were elected:

President, Frank Baackes, general sales manager, American Steel & Wire Co.; vice president, F. T. Bentley, traffic manager, Illinois Steel Co.; secretary, J. P. Walker, assistant secretary, Illinois Steel Co.; treasurer, F. T. Llewellyn, western manager, American Bridge Co.; directors for two years, P. W. O'Brien, D. A. Merriman, R. W. Campbell, B. F. Affleck, F. C. Gedge, S. P. McGough; directors for one year, W. H. Eaton, F. E. Learned, H. S. Raymond, W. A. Field, A. B. Newman.

The association is an outgrowth of the Illinois Steel Club, an organization that was formed a year ago, but whose membership was confined to employes of the Illinois and Carnegie Steel companies The closer acquaintance resulting from this fellowship was so beneficial that it was deemed desirable to extend the same to the employes of the other constituent interests of the Steel Corporation, leading to the formation of the larger organization. A committee composed of a representative from each of the thirteen companies, drew up a constitution and by-laws, and issued the following call for the first meeting:

Whereas, There are located in Chicago either general or local offices of thirteen constituent companies of the United Steel Corporation, and,

Whereas, There now exists between the employes of these companies no acquaintance or friendship other than that which is incidental to the nature of business,

Therefore, As you have agreed to become a charter member of the Steel Club you are urgently requested to be present at the first annual meeting and informal dinner of this club which will be held at the Auditorium at 6:30 on Tuesday evening, Nov. 20. As large an attendance as possible is urged in order that a success may at once be achieved which is fitting to a movement for the promotion of closer and more friendly relations between men in the service of the United States Steel Corporation and its subsidiary companies.

The object of the club is simply to promote close and friendly relations and to secure a closer affiliation between the men in the service of the various interests of the company. Meetings will be held monthly, and the dinner will be followed with informal talks taking the nature of an interchange of ideas and knowledge connected with the various departments in which the members may be engaged. There are two classes of membership—active and honorary. None but Chicago employes of the Steel Corporation will be admitted to active membership, and these will be by invitation only. Men in the service of the Steel Corporation or its subsidiary companies outside the Chicago district may be elected to an honorary membership by a two-thirds vote of members present at any annual meeting.

RECENT DEVELOPMENTS IN THE DOMINION DIFFICULTY.

(Special Correspondence.)

Toronto, Can., Nov. 26.—Negotiations between the Dominion Iron & Steel and Dominion Coal companies were in progress during the past week, but a settlement is apparently as far away as ever. The coal company takes the position that the contract calls for "run of mine" coal, reasonably free from stone and shale, and that what the steel company seeks to claim is selected coal. The latter says it is prepared to make a new contract for selected coal from particular mines, on the understanding that threats of law suits be laid aside. The steel company, in a letter dated Nov. 23, which may be regarded as an ultimatum, says it cannot accept any coal if the purchase is to imply a waiver of its rights under the contract, and can discuss no modification of the contract until it has been reinstated in its rights under it and damages have been adjusted. Manager F. P. Jones, of the steel company states that it is getting coal from other Nova Scotia companies as well as from England and the United States and that the rail mill will very shortly be started.

The Quincy Engine Co. is enlarging its plant in Quincy, Franklin county, Pa. A brick foundry is being erected, a large addition will be made to the machine shop and new cupola will be built.

TRANSPORTATION AND LABOR SHORTAGE CONTINUES TO EMBARRASS SOUTH.

(Special Correspondence.)

Birmingham, Ala., Nov. 26.—All attention in the Southern territory is being given to the delivery of iron. The wretched conditions on the iron highways has caused considerable delay in deliveries on orders which were booked weeks and weeks ago. The railroad officials are doing all they can. One of the larger systems has been succeeding fairly well, both in the handling of raw materials in the district, and of the iron and finished product away from here, but others have been in a bad shape. The car shortage situation is intensified by the lack of sufficient motive power to care for what business is offered. There is a car shortage annually, but this year it has been on longer and now appears to be worse than ever before. There is no denying the fact that the railroad situation has interfered to a certain extent with the iron mart, though the furnace companies cannot point to a large accumulation of the product on their furnace yards. Sympathy is due to both the furnacemen and the railroad officials. The promise has been given that there will be but little interruption in the railroad operations this year on account of the holiday season, and employes are to be urged to keep at work in order that the immense tonnage can be handled as promptly as possible.

Continued good weather allows a large output at the coal and ore mines, limestone quarries and other places where raw material is furnished for the furnaces. Were the transportation facilities satisfactory, bins at the furnaces would be well filled all the time.

The labor situation shows but little improvement in Alabama. Much talk as to importation of foreign labor does not result in any great amount being brought in; in fact, inquiry from week to week reveals as much of a need for labor as previously. The organized labor element in Alabama has gone on record as favoring the enactment of a law by the legislature of the state looking to the inducement of labor to the state that will make good citizens. The enactment of a law providing for a commissioner of immigration or labor is also endorsed by the labor element. It is not improbable that, in the face of similar endorsements by commercial organizations throughout the state and by immigration societies, the legislature, when it meets in a few weeks, will take up the subject and enact laws that will offer inducements to desirable immigrants, providing for a commissioner who will not only protect the interests of the state in watching the immigrants coming here but will give much of his time in inducing immigrants to come.

HARBISON-WALKER REPORT.

The annual report of the Harbison-Walker Refractories Co., Pittsburg, for the fiscal year ending Sept. 30, last, shows net profits of $1,739,082, against $1,169,990 the previous year and $1,068,057 in 1903 and 1904. After deductions of $100,000 for new construction work and heavier charges in other lines of expense, net profits of $1,499,393 are shown, an increase of more than $400,000 over the previous year. The balance sheet of Sept. 30 shows total assets of $33,193,139, to which $28,748,710 is contributed by the item of properties and franchises of constituent companies. In the course of his report President S. C. Walker said: "As fire clay is widely distributed over several states, it is practically impossible to control the raw stock. Unnatural or artificially sustained prices are a constant incentive to the erection of additional plants and the bringing of new people into the business. While the management recognizes that price agreements, purchase or consolidation with other plants would largely increase profits, such increase would only be temporary and would finally leave the business in much worse condition for everybody who stayed in it. As those in the management of the company hold their stock for investment and not for speculative purposes, they have, after very careful consideration, decided that they will neither purchase works nor enter into price agreements, even if the agreements submitted were lawful."

SOUTHERN STEEL PLANS.

Directors of the Southern Steel Co., with residence in New York, including President Moses Taylor and C. P. Perin, chairman of the executive board, were in the south during the past week inspecting the properties of the company located in Tennessee, Georgia and Alabama. The company is capitalized at $25,000,000 and has extensive ore, coal and limestone properties, four blast furnaces, very large steel and steel rod, wire and nail mills. At a meeting of the directors held in Birmingham, it was decided to make large appropriations for development and extensions of properties.

WAGES RAISED BY THE STEEL CORPORATION.

E. H. Gary, chairman of the board of directors of the United States Steel Corporation, on Nov. 23 issued the following announcement:

Common labor at the manufacturing plants of the subsidary companies of the United States Steel Corporation will be increased ten cents per day, commencing Jan. 1, 1907; and day and turn labor will be adjusted accordingly. Notices to this effect will be posted by the respective companies about Dec. 1, 1906.

This advance applies to about 68,000 employes who are classed as general laborers, including those who did not participate in the advance given the steel workers recently. It is understood that this increase in wages was unsolicited by the men and that it is a substantial recognition by the board of directors of the loyalty of the men through a year in which every department has been run at maximum speed and under conditions that have taxed the powers of all hands from top to bottom.

"The raise affects all our employes whether they are union men or not," said Judge Gary. "Our agreements with the unions expire on the date when the new wage scale becomes effective, and they will then be readjusted according to the general increase."

FREIGHT RATES MAY ADVANCE.

There is some talk of a proposed advance in freight rates from the south. It is intimated that, if the advance is made, it will be 25 cents per ton. The argument of the railroads will be that the advance in pig iron justifies the advance in rates. The shipping interests, however, contend that the service has been the poorest that has perhaps ever existed. The increased cost of operation is expected to be used by the railroads as an additional argument why they should advance the rates, but the shippers contend that the losses incurred through the delays and lack of cars is to them far more serious than the increased cost of operation to the railroads.

MAY SELECT NEW SITE.

Harrisburg, Pa., Nov. 27.—It is reported here that the Pennsylvania Railroad Co. has postponed the erection at Altoona of the proposed shop buildings for the construction of steel cars, which were estimated to cost about half a million dollars. It is also reported that there is a possibility of the shops being located either in this city or at Lucknow or Enola, two small railroad towns near here.

IRON ORE SHARES

Will Be Issued by the Great Northern.—A Novel Plan.

Details of the manner in which the Great Northern ore profits are to be divided were made public in a circular issued to the Great Northern railway stockholders. For every share of Great Northern, stockholders will receive a share of stock of the Lake Superior Co., Ltd., an unincorporated company, which has held the ore lands. The latter company will transfer the ore properties to Louis W., James N. and Walter J. Hill, sons of J. J. Hill, who will act as trustees for the shareholders. "The beneficial interest" will consist of 1,500,000 shares, which equals the amount of Great Northern shares. Thus the distribution will be on a share for share basis.

The net profits derived from the ore properties will be distributed at least once annually by the trustees. The United States Steel Corporation, under its lease, is to pay 85 cents per ton for all ore mined in the first year, beginning 1907, with an increase of 3.4 cents per ton a year, for an indefinite period.

President Hill, in the circular, says:

Certain iron ore properties have been acquired and are now held for your benefit by the Lake Superior Co., Ltd. The board of directors of your company, by resolution approved by the stockholders, has authorized and instructed the Lake Superior Co., Ltd., to transfer the iron ore properties to Louis W. Hill, James N. Hill and Walter J. Hill, to be held by them in trust and for the benefit of the stockholders of the Great Northern Railway Co., appearing as such of record at the close of business on the sixth day of December, 1906, and of their assigns.

The entire beneficial interest of the trust to be created will consist of 1,500,000 shares, and each stockholder of this company of record on the date above named will receive from the trustees a certificate for a number of shares of beneficial interest in said trust equal to the number of shares of stock of the Great Northern Railway Co., held by him. The certificates issued by the trustees will be transferable upon their books in the same number as stock certificates.

The net proceeds and profits of the iron properties will, from time to time, and at least once each year, be distributed by the trustees to the certificate-holders of record at the date of distribution.

For the purpose of making the distribution of certificates, the transfer books of this company will be closed at 3 p. m. on Dec. 6, 1906, and will be reopened at 10 o'clock a. m. Dec. 8, 1906. On or about Dec. 8, 1906, the trustees will issue and deliver to the stockholders entitled thereto temporary certificates for the number of shares of beneficial interest to which each stockholder shall be so entitled.

Upon the surrender of such temporary certificates to the trustees, at their office, 32 Nassau street, New York, on or about Jan. 15, 1907, certificates in permanent form will be issued in exchange therefor.

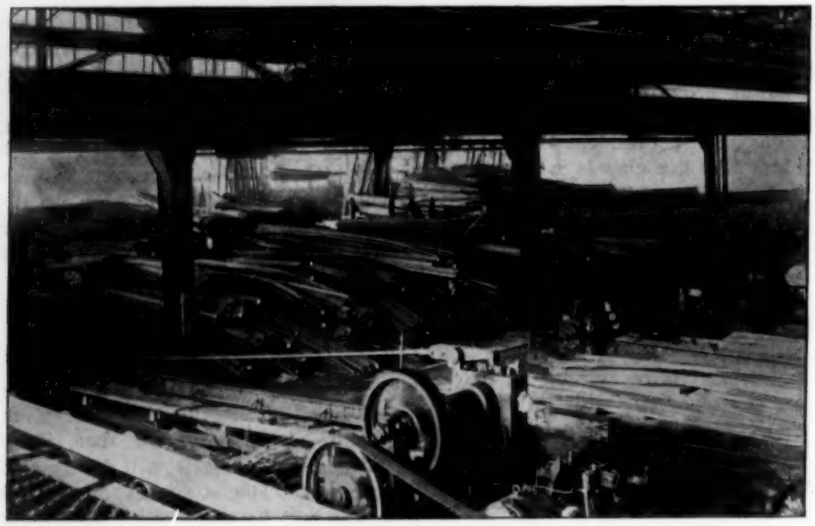

ILLUSTRATION OF EFFECT OF CAR SHORTAGE ON PITTSBURG MILLS.

The Birdsboro Steel Foundry & Machine Co. will build a new power house at its plant at Birdsboro, Pa.

COAL SHORTAGE

Embarrasses Operations of the Colorado Fuel & Iron Co. — Other News.

Pueblo, Colo., Nov. 27.—The local plant of the Colorado Fuel & Iron Co., for the past week has been facing a coal shortage of serious proportions, due to the scarcity of cars and the rush of business on the railroads, which is so large that the coal cannot be transported with sufficient facility to meet the requirements of the steel works. The fuel famine has been so acute at times that it has been necessary to shut down the wire mill and pig machine for a few hours until coal could be obtained to finish out the shift. The steel works use from fifty to sixty cars of coal daily, or a total of about 50,000 tons per month.

Five new furnaces are under construction at the south end of the open-hearth department. When these are completed the capacity of that department will be double what it is now.

Repairs on blast furnace A are practically completed and the furnace will be in operation in a few days. Blast furnace F is being rushed to completion despite the cold weather which has hampered the contractors considerably.

The new storage tank in the open-hearth department is finished and will be put in operation as soon as it has been sufficiently heated.

Lack of material caused the shutting down of the wire fence mill Nov. 24. The wire mill has been so pressed with other orders that enough wire could not be supplied to keep the fence making department running. The shut down is only temporary.

M. Sulzback, of Germany, and R. H. Oppenheim, of France, two industrial experts, were visitors at the steel works last week. The distinguished visitors are believed to be the repreentatives of European capitalists, although little was given out as to their connections. They are making a study of the mining and steel manufacturing industries of the country. After an inspection of the local steel works, they left for Denver, en route for Pittsburg, on a similar errand.

The managers of sales of the Republic Iron & Steel Co. will hold their next regular meeting on Dec. 3, at the headquarters of the company in Birmingham, Ala. These meetings are held for the purpose of an interchange of views, and to enable the agents to become familiar with the plants of the company.

PERSONALS.

Robert Wuest, acting commissioner of the National Metal Trades Association, is spending some weeks at Jamaica and South American points.

L. A. Wyman has taken service with the Dayton Pneumatic Tool Co., and will have charge of its business in Ohio and Indiana with headquarters at Dayton, O.

W. H. Lindelsee has been made superintendent of the Marion Malleable Iron Works, Marion, Ind. He has heretofore been foreman of the pattern shop.

J. O. Foose, chief engineer at the Brown-Bonnell and Bessemer works of the Republic Iron & Steel Co., has resigned and has been succeeded by Arthur L. Strickland.

H. Van Atta, superintendent of the J. L. Mott Iron Works, Mott Haven, N. Y., has joined the staff of George K. Hooper, mechanical engineer at 11 Broadway, New York.

H. W. Wilmot is in charge of a branch office opened in the city of Mexico by Jones, Caesar, Dickinson, Wilmot & Co., certified public accountants of New York.

W. C. Crowe, assistant superintendent of the Aetna Foundry & Machine Co., Warren, O., has been made general superintendent to succeed Sherman T. Penney, resigned.

Everett B. Webster has resigned as president of the National Steel Corporation, New Haven, Conn., and has been succeeded by Leroy Clark, heretofore treasurer of the Safety Insulated Wire Co., Bayonne, N. J.

Norman Gardner Ferguson, until recently a managing director of H. Borner & Co., Ltd., has joined the ore firm of J. Wild & Co., Middlesbrough, Eng., and will take charge of the London office, 5-7 St. Mary avenue, E. C.

I. A. Brown, formerly superintendent of transportation for the Ohio plant of the Carnegie Steel Co., has been made superintendent of transportation and labor for the new plant of the Jones & Laughlin Steel Co. at Aliquippe, Pa.

George F. Hurt, general manager of the Georgia Iron & Coal Co. until its properties were sold to the Southern Steel Co. not long ago, has opened offices in the Equitable building, Atlanta, Ga., for the Southern Hydraulic Engineering Co. An office has also been opened in Birmingham in charge of G. B. Turner.

Robert McF. Doble, of Colorado Springs, formerly of San Francisco, has been retained as consulting and supervising engineer by Curtis & Hine, general managers of the recently organized Central Colorado Power Co., in the development of their hydro-electric power projects on the Grand river, Colo.

Merger Announced. — Under the name of the Republic Engineering & Mfg. Co., a merger of the Federal Machinery Co., of Allegheny, Pa., and the Republic Engineering Co., of Pittsburg, is announced. The two plants have been consolidated at Bouquet street and Grant avenue, Allegheny, and the new company will continue the designing and manufacturing of special mill machinery, structural machinery, power transmission, elevating and conveying machinery, coal washeries, keyless shaft couplings, pipe couplings, special castings, etc.

An Enlarged Business.—In describing the nipple and pipe threading machine in last week's issue, credit for manufacturing it was given to the Kenneth-Anderson Mfg. Co. The Murchey Machine & Tool Co., Detroit, is now making this machine and its business has so enlarged that more commodious quarters were required, the plant being moved to 50-52 Porter and Fourth streets.

Will Repair Cars.—An inspection of the Depew plant of the American Car & Foundry Co. was recently made by officials of the New York Central railroad, as the result of which several thousand cars have been placed there for repairs with the idea of securing some relief from the present shortage of cars.

The Ingraham-Greener iron ore territories, located at Barachois, Boisdale, have been sold to the Nova Scotia Steel & Coal Co., which will immediately begin operations for their development. The tract is about one mile square and the ore is said to run very high in iron.

Indictments have been returned at Chicago against William D. Tilden, president of the Steel Ball Co., and C. L. Graham, vice president, in connection with the failure of the Milwaukee avenue state bank. It is charged that notes bearing fictitious signatures were discounted at this bank.

The Knoxville Iron Co. was compelled to shut down twice last week because of inability to secure coal as the result of the car famine. Other important industries at Knoxville fared a little better.

CASTINGS DYNAMITED AT YOUNGSTOWN SHOP.

At the plant of the Youngstown Furnace Co., Youngstown, during the past fortnight, four large castings, made for the Youngstown Sheet & Tube Co., have been mysteriously destroyed by dynamite. In one instance a heavy casting was blown to pieces and almost every window pane in the shop was shattered while the workmen were eating lunch. Parts of the casting were hurled a distance of 40 feet. The Youngstown Sheet & Tube Co. is an open shop with reference to its foundry department, and it is suspected that the outrages have been the work of union sympathizers.

At the Minneapolis meeting of the American Federation of Labor, resolutions favoring the removal of the protective tariff from structural steel were voted down. They were favored by leading spirits in the Bridge and Structural Ironworkers' union. The convention adopted resolutions condemning the action of employers in importing and arming hired detectives during strikes and calling on the union in the various states to urge legislation prohibiting private corporations from hiring armed men for any purpose whatever.

Two non-union structural ironworkers were badly beaten by union sympathizers at Minneapolis when the appeals of the latter, demanding that they quit work, were not effective.

The Warren Foundry & Machine Co., Phillipsburg, N. J., has increased wages an average of 10 cents, 600 men being affected.

The strike at the Penn Iron Works, Lancaster, Pa., which has been on since July 1, has been settled and the men have returned to work.

The Independent Allied Trades Union of the United States has been launched at St. Louis under a national charter with the idea of opposing the open shop principle, but, at the same time, forbidding a strike against any employer who will arbitrate, and denouncing the sympathetic strike principle.

Judge George Gray, of Delaware, who was chairman of the Anthracite Coal Strike Commission, has been selected as umpire on the board of arbitration to settle the differences between the Southern railway and its machinists.

The Reading Steel Casting Co. has arranged to double the size of its plant at Reading, Pa. The concern occupies the plant of the old Bryglon Steel Casting Co.

DEATH OF HENRY WEHRUM.

Henry Wehrum, formerly general manager of the Lackawanna Steel Co.'s plant at West Seneca, N. Y., and long a well known figure in the iron and steel industries, died Nov. 23 at his home, No. 700 Lafayette avenue, Buffalo. He was 63 years of age.

The death of Mr. Wehrum was a sad shock to his many friends and old business associates. On Sunday, Nov. 18, he suffered a stroke of apoplexy. Several times he rallied but gradually grew weaker until he sunk into unconsciousness from which he never awoke. Prior to the fatal attack he had complained of being poorly but none believed the end was close at hand.

Mr. Wehrum was a native of Germany and was an educated expert in steel matters before coming to this country in 1874. Several years previous he was appointed chief engineer of the large steel plant of Baron Dietrich in Alsace. His first position in the United States was that of chief engineer of the Lackawanna Iron & Coal Co. at Scranton, Pa. This plant he designed besides directing its construction and when the Lackawanna Steel Co. consolidated with the Lackawanna Iron & Coal Co., he was selected to be general manager. In this capacity he removed to Buffalo five years ago and in the early stages of the building of the great plant of the Lackawanna Steel Co. near that city he was a guiding hand.

Five years ago Mr. Wehrum retired from active life, thus closing a business career known on two continents as eminently successful. He is survived by his widow and four children, Mrs. Alfred Ernst, of Pittsburg, Pa.; Charlotte, Louise and Henry Wehrum, Christopher Wehrum and Charles Herbold, of Scranton, Pa., and one sister, Mrs. C. G. Ritz, of Scranton, also survive the deceased.

Henry Price, a director of the Star Furnace Co., Jackson, O., with which he had been connected for 38 years as manager of its coal operations, died Nov. 19 at the age of 81. He was a native of England, coming to this country when a boy.

Joseph K. Wheeler, a retired iron merchant, died Nov. 16 at his home in Philadelphia, aged 82. He was admitted to partnership in Morris, Jones & Co. in 1857, retiring to engage in the civil war, and was afterwards made secretary of the Pottstown Iron Co.

F. E. Ford, manager of the order department of the Illinois Steel Co., Chicago, died Saturday night from an attack of pneumonia after an illness of 36 hours. Deceased was 44 years old and had been connected with the Illinois Steel Co., since its organization, prior to which time he was identified with one of the companies absorbed by it.

George B. Kilbourne, manager of the Chicago office of the Kilbourne & Jacobs Mfg. Co., Columbus, O., and a son of its president, James Kilbourne, died Nov. 22 at the Grand Pacific hotel, Chicago, after a 10 days' illness with pneumonia. He was 33 years of age and had graduated from Williams college with high honors.

RIVER FURNACE CHANGE.

The Upson Nut Co., Cleveland, announces that on Aug. 1, next, it will take over the River furnace, which of late years has been leased by it to the Cleveland firm of Corrigan, McKinney & Co. The services of an experienced furnace man have been secured and the company is prepared to quote on No. 2 foundry and malleable iron for delivery during the last half of the year. The stack has an annual capacity of about 75,000 tons, and has been operated under the name of the River Furnace & Dock Co.

Gustave Benjamin, of the Benjamin Iron & Steel Co., Buffalo, N. Y., has taken over the Elmira Rolling Mill Co.'s plant at Elmira Heights, Elmira, N. Y., and will begin rolling refined merchant bar iron before Dec. 1. The mill is now being thoroughly overhauled.

The St. Louis blast furnace, which had been shut down for weeks for repairs, has started up again. The furnace has installed a new stove and new bin system which will increase the capacity of the plant about 15 per cent.

The Hermanee Co. has broken ground for an addition to its plant at Williamsport, Pa. A new foundry will be built at once to handle the increasing business of the company.

Furnace No. 2 of the Allentown rolling mills, at Allentown, Pa., is to be started very soon.

Metal Market

ST. LOUIS.

November 19.

Spelter was active and strong today with a tendency to advance prices. One hundred tons sold at $6.35 and 50 tons at $6.35. Lead was quiet but firm at 5.87½ for Missouri brands.

An advance in the assay price of zinc ore is attributed to the first touch of winter, which froze up many of the mines, stopping operations. Shipments from the Missouri-Kansas field were light as no cars were loaded until Thursday.

NEW YORK.

November 26.

Pig Tin.—Extensive purchases by the United States Steel Corporation during the week has strengthened the market. Today a quiet tone prevailed.

The following are today's quotations. Spot, 43 to 43¼; November, 43 to 43¼; December, 43 to 43¼; January, 43 to 43¼; London, £197 2s 6d and £198 2s 6d. Arrivals for the month to date, 3,024. Afloat, 2,610 tons.

Copper.—Reduced domestic buying has sent larger shipments abroad. The market is firm. Today's quotations: Lake, 22¼ to 22¾; electrolytic, 22 to 22¼; casting, 21¾ to 22; London, £101 7s 6d and £102 7s 6d. Exports for the month to date, 14,167.

Lead.—Refined lead has been in moderate demand and the market rules steady. Today's quotations, 5.95c to 6.00c; St. Louis, 5.85c; London, £19 7s 6d.

Spelter.—The demand has been active and prices are firm. Today's quotations: 6.40 to 6.45; St. Louis, 6.35; London £28.

CHICAGO.

November 27.

The market continues very active. Demand is insistent and early shipments hard to obtain. Pig tin has declined to 45½c for large lots, and 45¾c to 46c for smaller quantities. Lake copper is unchanged at 24c for carload lots, and casting at 24½c to 24¾c. Spelter is firm at 6.60c in carload lots, and sheet zinc at 8c list f. o. b. LaSalle in car lots of 60-lb. casks. Lead desilverized is quoted 6.05c to 6.15c for 50-ton lots. Antimony, 28c for Cookson's, and 26½c to 27½c for other grades.

The demand for old metals is brisk and dealers have little difficulty in disposing of their supplies at good prices. We quote dealers' buying prices as follows:

Copper wire, 18½c; heavy copper, 18c; copper bottoms, 17¼c; copper clips, 17¾c; red brass, 17¾c; yellow brass, heavy, 13c; yellow brass borings, 12c; red brass borings, 14½c; light brass, 11c; pipe lead, 5.15c; tea lead, 4¾c; zinc, 4½c; tin foil, 33c, pewter, No. 1, 25c.

A COMPARISON OF UNIVERSITY AND INDUSTRIAL DISCIPLINE AND METHODS.[1]

By Frederick W. Taylor.[2]

The point from which I view college education is that of the employer, not that of the educator. I have had no experience with the difficult and complicated problem that faces the professors and the governing boards of our colleges. On the other hand, I have been engaged for years in organizing the shop, office and commercial management of quite a wide range of engineering and manufacturing establishments. This has brought me into intimate personal contact with a large number of college graduates, and I have become well acquainted with their strong points, which are many, and at the same time with a few of those points in which it would seem that as a class they might be improved. And in what I shall say I have principally in mind the preparation of young men for success in commercial engineering and industrial enterprises; in other words, enterprises outside of the four learned professions.

Despises Pessimist.

I despise the pessimist who sees nothing but the defects and blunders of mankind, and the scold, whose pleasure it is to complain of all things as they are.

Let me say at the start, that without question our college graduates as a class represent the finest body of men in the community. And as to the value of an engineering course for men in our profession, our fellow-townsman, Mr. Jas. M. Dodge, in his admirable paper on "The Commercial Value of an Education," has shown through carefully gathered statistics, that within a few years after graduation the college educated engineer far outstrips in position and salary his average competitor who comes up from the ranks.

It would be a much more congenial task to dwell upon this view of the profession, but something may possibly be gained by considering what has seemed to many of the friends of our young graduates to be the one defect which they practically all have in common.

Graduates Discontented at First.

For a period of from six months to two years after graduating they are, generally speaking, discontented and unhappy. They are apt to look upon their employers as unappreciative, unjust and tyrannical, and it is frequently only after changing employers once or twice and finding the same lack of appreciation in all of them, that they finally start upon their real careers of usefulness.

On the other hand, the attitude of employers toward young graduates is fairly expressed by the following written instructions given for the selection of quite a large number of young men to fill positions which presented opportunities for rapid development and advancement. These instructions were to give the preference—first, to graduates of technical schools; second, to the graduates of the academic departments; but to employ no college boy who had not been out for more than two years.

Why is it, then, that these young men are discontented and of practically little use during the first year or two after graduating?

To a certain extent this is unquestionably due to the sudden and radical

Frederick Winslow Taylor.

change from years spent as boys almost solely in absorbing and assimilating knowledge for their own benefit to their new occupation of giving out and using what they have for the benefit of others. To a degree it is the sponge objecting to the pressure of the hand which uses it. To a greater degree, however, I believe this trouble to be due to the lack of discipline and to the lack of direct, earnest and logical purpose which accompanies, to a large extent, modern university life.

During the four years that these young men are at college they are under less discipline, and are given a greater liberty than they have ever had before or will ever have again.

As to college discipline, it cannot be a good training for after life for a young man deliberately to be told by the university authorities that he can flagrantly neglect his duties sixty times in one term before any attention will be paid to it; while, if in business, the same young man would be discharged for being absent two or three times without permission.

And as to the freedom offered by the modern university system, it is not true that boys from eighteen to twenty years old have the knowledge and experience necessary to select a logical and well-rounded course of studies, and even if they had this wisdom, the temptation to choose those studies which come easiest is so strong that it would be unwise to throw upon them so great a responsibility. Nor does it appear wise to leave each student free to study as little or as much as may suit him, at times doing practically no work for days, and at others greatly overworking, with no restraint or direction except the round-up which comes twice a year with examinations. At the least, it must be said that in commercial or industrial life this undirected liberty will never again be allowed them.

Radical Changes Have Occurred.

During the past thirty years two radical changes have occurred in educational methods. The kindergarten and its accompanying ideas has come for the children, and for the young men has come the change from the college, with its one or two courses carefully selected and rigidly prescribed by the faculty, to the university with as many different courses as there are young men, and in which under the elective system each student is given the choice of all of his studies.

The fundamental idea back of the change from college to university is excellent; namely, that of providing for different tastes and abilities of the students, and to especially prepare them for their future occupations. Accompanying, however, this great step in advance, and yet, so far as I can see, in no way logically connected with it, has come the false step of giving our young men in many ways a greater liberty than is allowed, on the whole, to any other class of active workers; and of handing over to them the final decision in a subject most needing a master mind.

Commercial, manufacturing and other enterprises in which many men co-operate, are managed more and more by delegating all important decisions to a few men whose judgment has been trained through long experience, study and observation in those matters which they are called upon to decide. Yet many of our universities are managed by giving over to the young man, under the elective system, the final decision as to what studies will best fit him for his life's work, although he has, of necessity, but the vaguest idea of the nature of the subjects which lie before him. It is almost

[1] An address delivered at the dedication of the Engineering Building of the University of Pennsylvania.

[2] President of the American Society of Mechanical Engineers.

like asking him to lift himself up by his boot straps.

Useful Principles.

Of all the habits and principles which make for success in a young man, the most useful is the *determination to do and to do right all of those things which come his way each day, whether they are agreeable or disagreeable* and the ability to do this is best acquired through long practice in doggedly doing along with that which is agreeable a lot of

True co-operation, co-operation upon the broadest scale, is that feature which distinguishes our present commercial and industrial development from that of one hundred years ago. Not the co-operation taught by too many among those of our trades unions which are misguided, and which resembles the co-operation of a train of freight cars, but rather that of a well-organized manufacuring establishment, which is typified by the co-operation of the various parts of a watch, each member of which performs and is supreme in its own function, and yet is controlled by and must work harmoniously with many other members.

Selection and Purposes of Studies.

An examination of the studies chosen by boys in the university academic departments will show that the logic and motive back of about one-half of the students is that of obtaining an easy course, and even the better students show generally a lack of clear-cut, logical purpose in their selection. In their case, the studies are chosen because the young man likes or is interested in the subjects, or because they come easy to him, rather than because they give a well-rounded and balanced course with a distinct logical purpose. The loose, flabby, purposeless courses chosen by fully one-half of the students under the present system furnish but poor mental diet.

Why cannot all of the good features of the elective system be better attained by permitting each young man to choose in general the object or purpose for which he wishes to educate himself, and then leaving the entire course of studies to the one or more professors in the faculty who are especially fitted to plan a complete and logical course in the chosen field? Let the young man say where he wishes to go, and let the faculty tell him the road he is to travel to get there.

As to the object of college life, some boys are sent to the university to learn how to mingle with men, and to form friendships which shall prove useful and agreeable in after life. Some go there to amuse themselves, and some go to get the standing given by a college degree.

Something can be said for each of these objects. Is not the true object of all education, however, that of training boys to be successful men? I mean men successful in the broadest sense, not merely successful money getters. Successful, first, in developing their own *characters, and, second, in doing their full* share of the world's work.

In all earnest enterprises which the students themselves manage, they throw the elective system to the winds and adopt methods and a discipline quite as rigid as those prevailing in the commercial and industrial world.

Is not the greatest problem in university life, then, how to animate the students with an earnest, logical purpose?

In facing this question I would call attention to one class of young men who are almost universally imbued with such a purpose; namely, those who, through necessity or otherwise, have come into close contact and direct competition with men working for a living. These young men acquire a truly earnest purpose. They see the reality of life, they have a strong foretaste of the struggle ahead of them, and they come to the university with a determination to get something practical from the college training which they can use later in their competition with men.

They are in great demand after graduating, and as a class make themselves useful almost from the day that they start into work.

Neither their earnestness of purpose, however, nor their immediate usefulness, comes from any technical knowledge which they have acquired while working outside of the university, but rather from having early brought home to them the nature of the great problem they must face after graduating. Nothing but contact with work and actual competition with men struggling for a living will teach them this. It cannot be theorized over or lectured upon, or taught in the school workshop or laboratory.

I look upon this actual work and competition with men working for a living as of such great value in developing earnestness of purpose that it would seem to me time well spent for each student, say, at the end of the freshman year, to be handed over by the university for a period of six months to some commercial, engineering or manufacturing establishment, there to work as an employe at whatever job is given him, either manual or other work. He should have the same hours and be under the same discipline as all other employes, and should receive no favors. Moreover, he should be obliged to stay even a longer time than six months unless he has in the meantime given satisfaction to his employers.

Cooperation of Business Men Obtainable.

I believe that there would be but little difficulty in obtaining the co-operation of our business and manufacturing establishments in carrying out this plan, and the University of Pennsylvania, situated as it is in the foremost manufacturing city in this country, would have an especially good opportunity to inaugurate it.

My belief in the benefits to be derived from doing practical every day work early in the college course is not the result of a theory. It is founded upon close observation and study of young men who have had this experience, and also upon a vivid remembrance of breakfasting each morning at five-thirty, and starting to sweep the floor of a pattern shop as an apprentice some thirty-two years ago, after having spent several years in preparing for Harvard college. The contrast between the two occupations was great, but I look back upon the first six months of my apprenticeship as a patternmaker as, on the whole, the most valuable part of my education. Not that I gained much knowledge during that time, nor did I ever become a very good patternmaker; but the awakening as to the reality and seriousness of life was complete, and, I believe, of great value.

Unfortunately, laboratory or even shop work in the university, useful as they are, do not serve at all the same purpose, since the young man is surrounded there by other students and professors, and lacks the actual competition of men working for a living. He does not learn at college that, on the whole, the ordinary mechanics, and even poorly educated workmen, are naturally about as smart as he is, and that his best way to rise above them lies in getting his mind more thoroughly trained than theirs, and in learning things they do not know. All of this should be taught him through six months' contact with workingmen.

Let me repeat in conclusion that our college graduates are the best picked body of men in the community. Yet I believe that it is possible to so train young men that they will be useful to their employers almost from the day that they leave college so that they will be reasonably satisfied with their new work instead of discontented; and to place them upon graduating one or two years nearer success than they now are; and that this can best be accomplished by giving them an earnest purpose through six months' contact early in their college life with men working for a living; by rigidly prescribing a course of studies carefully and logically selected, and with some definite object in view, and by subjecting them to a discipline comparable with that adopted by the rest of the world.

THE BONVILLAIN MOLDING MACHINE

NEW LINE OF PATTERN PRACTICE IN FRANCE.

Methods Providing Flexibility, Rapidity and Accuracy in the Foundry.

While we have been priding ourselves in this country that we were making the most rapid progress in molding machines, we find that rapid progress is also being made in other countries and the following is a description of some of the latest developments in French machines, which is given practically in the words of the inventor of the process, Ph. Bonvillain, of Ph. Bonvillain & E. Ronceray, Ingenieurs, 9 & 11 Rue des Envierges, Paris, France.

The molding machines used in the United States can be divided roughly into three classes.

Those worked entirely by hand.

Those operated entirely by compressed air.

Those operated partially by compressed air and partially by hand.

In the first class we have the old roll-over type machine, the hand squeezer, and the well-known hand-ramming, stripping plate machine.

The second class comprises very few machines, for even when the pattern is rammed by compressed air it is usually drawn by hand.

The last class includes the majority of the machines using compressed air.

A roll-over machine is in reality more of a jig than a machine. When the castings have been properly designed, with their parting lines on a flat or nearly flat surface, wooden patterns may be used on a machine of this class and the fitting up of the patterns is not expensive. Though the makers claim that ordinary flasks can be used in most cases it pays to have flasks specially machined. A machine of this type is slow in operation and is used only for special classes of work.

The hand-ramming stripping plate machine is very extensively used in the United States, the molds requiring little or no patching, on account of the fact that the sand is well-supported during the drawing of the pattern from the stripping plate. A machine of this type is not a complicated one, though the bearings are liable to become quickly worn by sand falling into them. The cost of using such a machine is found in the fitting up of the pattern plate, for it requires an expensive stripping plate for each pattern. In cases where the parting line is not a flat surface the cost is very greatly increased. In fact, these machines are confined largely to the production of special castings which are turned out in large quantities. In many cases the machine is fitted up with a pattern and stripping plate for the manufacture of but a single casting.

The machines operated entirely by compressed air are not numerous. In machines of this type when the pattern is drawn by power and no stripping plate is used, the sand tends to break away and the use of the shaker or vibrator has been found necessary.

There are different ways of ramming sand by power. The most common is to put the pattern plate and flasks on a table mounted upon a ram

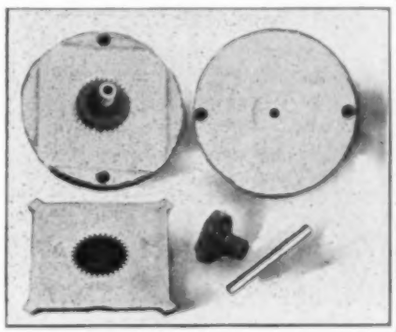

FIG. 1.—MOLDING SPUR AND BEVEL GEAR.

worked by compressed air. A beam is fixed above to which is attached a piece of about the inside dimensions of the flask. The ramming is then accomplished by giving two or three blows against the ramming block supported over the flask. This operation can be accomplished very quickly, but the hardness of the sand can not be regulated and the severe shocks repeated continuously make the machine very costly to keep in good working order. The pattern plates have to be very strong, also all other appliances used, including the flasks.

Though the various types of machines used in the United States are already numerous, it seems that there is really an opening for a universal machine, accompanied by a carefully designed system of making pattern plates. This is especially true in the case of jobbing foundries receiving orders for from 50 to 100 castings or for those making intricate castings which cannot be molded on the machines now in use. The Universal system of molding, as it has been called, from its capabilities, is in no sense inferior to that developed in connection with other machines on the market. All jobs capable of being made on other machines can also be made on the Universal machines as quickly or quicker. In addition, any casting which is within its capacity and required in numbers of fifty or more, can be produced to advantage. The more difficult the pieces are the greater will be the saving by using the Universal molding process.

Operating Agent.

It is a very strange fact that few, if any, molding machines used in America are worked by any other agents than compressed air. This is the worst agent and the most expensive one which can be adapted for operating a molding machine. The best agent is water under pressure, as it gives a smooth, steady motion for ramming as well as for drawing the pattern.

The ramming of all molds can not be accomplished entirely by power, as in all cases except on flat patterns, some work has to be done by hand. When the castings have projections or pockets, the sand cannot be expected to be hard in those parts except in cases where some special provision is made or some hand work is done. All claims that a machine does all of the ramming in all cases are simply pretensions and every practical man is aware of this fact.

The system of ramming by giving a series of blows upon a frame supporting the pattern plate and the flask by throwing it against a fixed piece is a very crude means for hardening or packing sand. A steady pressure applied on the mold is more apt to give the proper hardness that must differ for each kind of mold and for each part of the mold. All of the Universal machines are provided with pressure gauges to enable the operator to regulate the actual pressure in the cylinder according to the size of the flask, the material to be poured and the shape of the mold. In an article of this character we cannot go into all of the details of perfect ramming, but all practical men know how it varies

with different conditions of practice.

The drawing of patterns requires a steady, gentle motion that cannot be obtained by an elastic fluid, such as compressed air. This is probably the chief reason why most of the machines using compressed air are arranged for hand drawing. If a little time can be saved by power ramming it will be found that a great saving can also be made by a perfect system of drawing the patterns so as to leave little or no patching to be done by hand in the completion of the mold. It takes a comparatively short time to ram a mold, but if the sand breaks in drawing, the mending of the molds means a loss of time considerably greater than the difference in time between hand and power ramming. It is on this account that the Universal system has been devised for saving all of this patching work. This is accomplished by giving especial care to the arrangement of the pattern, stripping plates, and the drawing arrangements of the machine itself. The care expended upon this machine has resulted in doing away with practically all patching and also has effected a considerable saving by enabling the machine to produce the majority of the vertical cores in green sand.

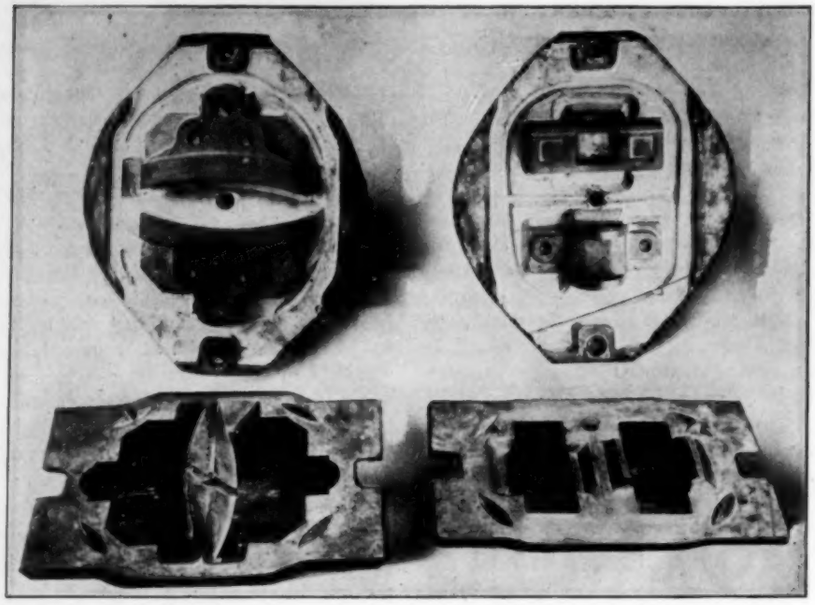

FIG. 2.—EXAMPLE OF OTHER WORK.

Examples of Work.

Especial equipment necessary for producing the combined spur and bevel gear shown in Fig. 1 is illustrated in the same figure and is composed of two pattern plates, a stripping plate and a stool. The stool is shown at the right, below one of the pattern plates and consists of a cylindrical bar used for pushing the core up as the mold is removed from the pattern. The core is made in halves, one-half in the cope and the other in the drag, the two parts meeting in the center of the mold. Another example of work accomplished by this system is shown in Fig. 2. At the left of Fig. 2 are shown the pattern plate and stripping plate for producing a railway brake shoe and at the right of Fig. 2 the pattern plate and the stripping plate for a special box. The castings from these two sets of patterns and plates were decidedly successful both from the standpoint of handling and cleanness. It will be noticed that the stripping plate used for the brake shoe is very irregular in its outline and departs a long way from a plane surface.

A set of pattern plates and the casting for a railway axle box and for another type of brake shoe are shown in Fig. 3. It will be noticed that in the case of the box all of the internal cores and the cores for the bolt holes are made upon the machine, while in the case of the brake shoe the three core holes in each shoe are also made upon the machine.

The same system is also applied to much more complicated work and a good example of this class is shown in Fig. 4, which illustrates the production of an aluminum casting for the De Dion-Bouton motor cars. It will be noticed that the inside of the casting is formed by a core which is made entirely upon the machine, the projections being obtained by detachable pieces which are drawn in by hand after the main portion of the pattern has been withdrawn.

From the examples given it will be seen that by using a steady water pressure very satisfactory work may be obtained and a great saving accomplished where the work is properly arranged. Another very marked saving is in the power required to op-

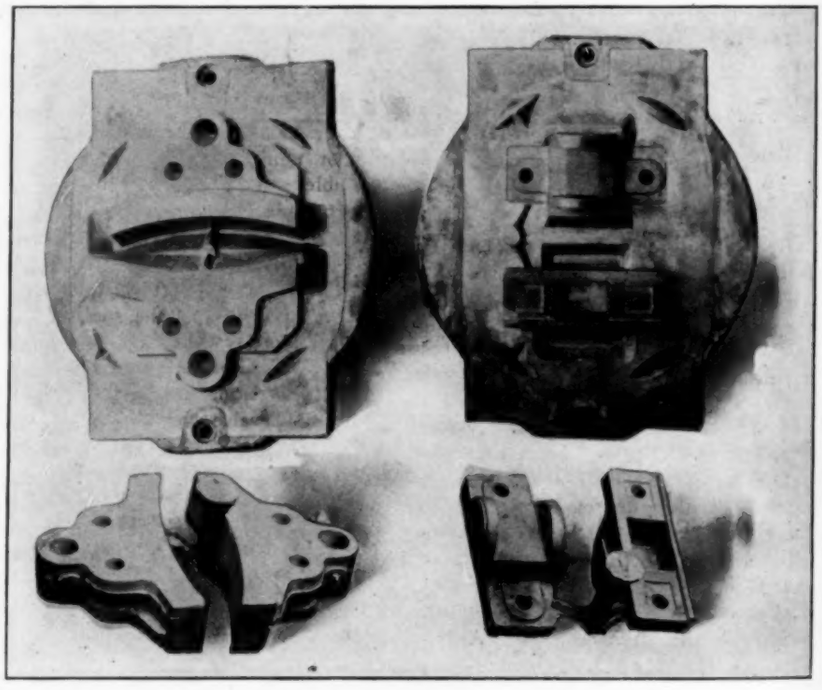

FIG. 3.—PATTERN PLATES AND CASTING.

erate the machines. To give a blow of 12 tons with 100 pounds of compressed air and a stroke of 8 inches requires 1¼ cubic feet of compressed air, and for three blows will require 3¾ cubic feet for a flask, that is, about 30 cubic feet of free air. If we admit that the production is 30 flasks in an hour, it will require a compressor capacity of 30 x 30 divided by 60, which equals 15 cubic feet of free air per minute, and if we do not count the losses in piping it will require from 3 to 4 horsepower to operate one molding machine.

When using water pressure at 750 pounds per square inch a pressure of 12 tons is obtained with a ram 7 inches in diameter, the stroke being about 2 inches. The drawing of the pattern is then accomplished by a ram 3½ inches in diameter, having an average stroke of 6 inches. This means the consumption of about half a gallon of water per flask, that is, 15 gallons an hour, or theoretically, 1-10 of one horsepower. From this it can be seen that the economy in the use of water is a factor which should not be neglected and it must also be seen that an additional economy will be found in the advantage arising from the fact that hydraulic plants can be maintained for far less money than compressor plants.

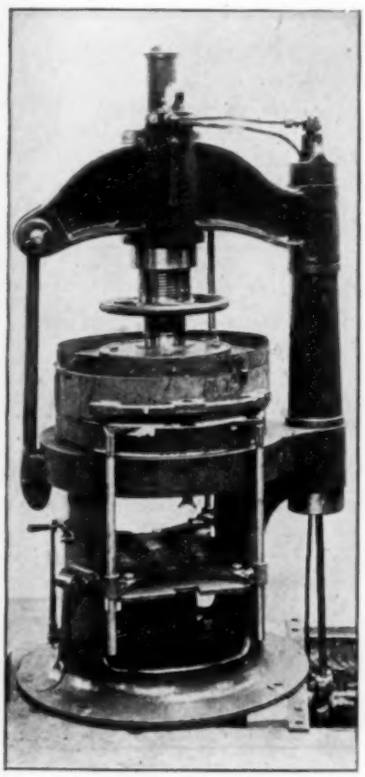

FIG. 5.—GENERAL DESIGN OF MOLDING MACHINE.

A small double-acting pump for supplying water at high pressure is being used which has been designed especially for use in connection with molding machines. Pumps of a similar style, but single-acting, are also furnished. A single-acting pump is sufficient to operate from 3 to 6 machines working on an average line of work, while a double-acting pump will take care of 8 to 12 machines.

It is a well-known fact that any equipment about a foundry is liable to be neglected, and on this account pumps certainly have advantages over air compressors. The valves in the style of pumps used are made very accessible. The piping connections are not made to the valve box, as usual, but to the pump body proper and the parts so arranged as to bring water to the solid part of the pump body, pass it through the suction, the cylinder, the pressure valve, and out into the high pressure pipe. With this construction, if anything goes wrong in the valve box it is not necessary to lose any time on account of a lengthy shut down for repairs, for the valve box can simply be removed and replaced by a new one, leaving the injured part to be repaired while the plant is in continuous operation. The pump is so constructed that the valve body can be set in either a horizontal or vertical position, permitting the pump to be mounted horizontally as here or in a vertical position. It will also be noticed that the lubrication is by means of grease cups. A single-acting pump requires ½ to ¾ horsepower, while a double-acting pump requires 1 to 1½ horsepower. Of course it is necessary to use hydraulic accumulators, but these are of the simplest possible design.

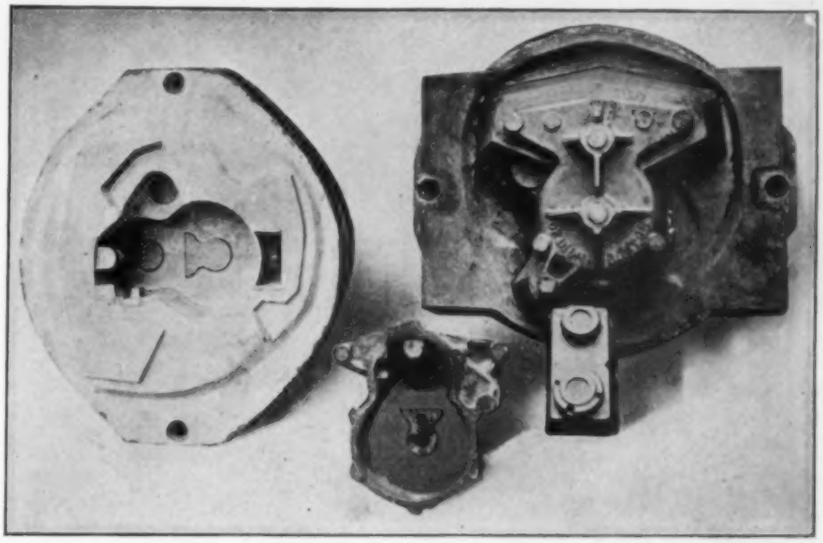

FIG. 4.—ALUMINUM CASTING FOR MOTOR CAR.

The Molding Machine.

The design of the Universal molding machine is very different from that of the other molding machines generally found on the market. It is the result of long experience in machine molding where nearly all possible classes of work have to be made, and its introduction marks a considerable improvement in this branch of the foundry business. Though this machine can use ordinary pattern plates, it is more especially adapted to the use of a patent improved process for making pattern and stripping plates. The use of this complete system is revolutionizing foundry methods in the countries where it has been adopted.

The general design of one style of this class of machine can be seen by consulting Fig. 5, and it will be noticed that it comprises a very strong base which is made as low as is consistent with the good working of the machine. The level of the table should not be more than two feet above the floor level so as to permit easy manipulation of flasks and sand. The base is left open on the sides for reasons that will be explained later. The table has a side projection bored to receive a strong pillar. In this pillar revolves a hollow steel column, at the top of which is fixed a cross beam and between the pillar and the cross beam there is inserted a ball bearing to reduce friction. The upper and lower ends of the hollow column are threaded and fitted with nuts to receive the thrust. The cross beam is bored centrally to receive the main

ram and at the opposite end is fitted with a hook that can engage the side of the table as shown.

Projecting above the beam there is a return cylinder which is always under accumulator pressure and serves to automatically return the main ram when the exhaust is open. The main ram is threaded internally to receive the hollow socket which is threaded both internally and externally, and fitted with a hand wheel as shown. The eye of the socket receives a threaded projection upon the platen or face for receiving the ramming block. The main ram or platen is prevented from revolving by suitable devices so that when the hand wheel is turned the platen is moved up or down. By this means the distance between the face of the table and the platen can be regulated according to the height of the pattern plates, flasks, etc., in use, thus saving time and also any unnecessary waste of water used under high pressure for compressing the sand.

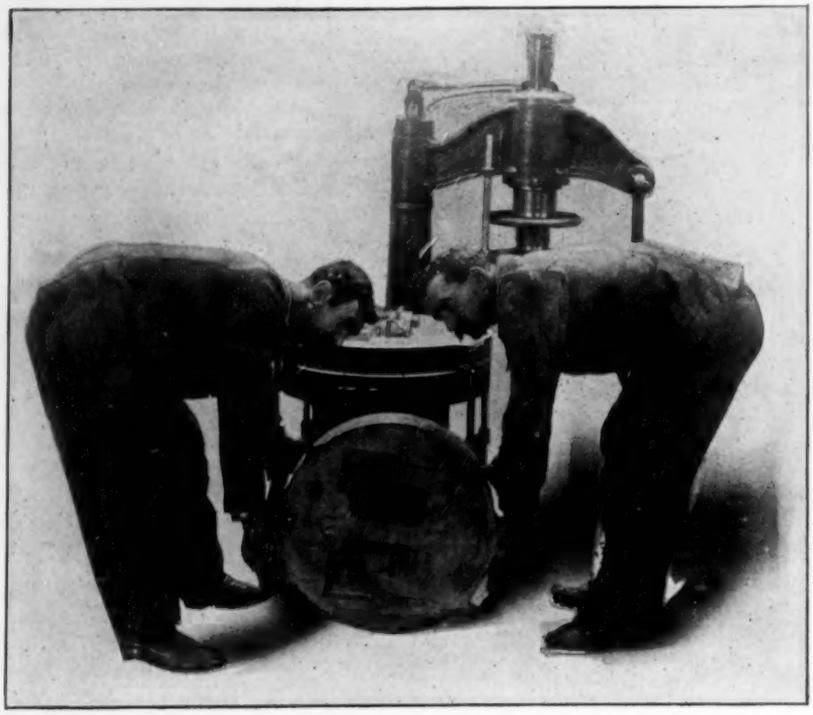

FIG. 6.—SHOWING THE ACTION OF THE MACHINE.

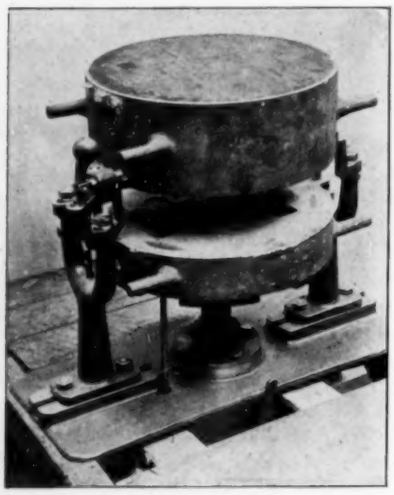

FIG. 7.—SPECIAL MACHINE WITH FLASKS IN PLACE.

When the machine is properly adjusted the stroke of the main ram is exactly the distance required to pack the sand. The motion of the main ram is controlled by a single lever which is very sensitive. Pulling the lever forward applies the pressure. Throwing it back to a vertical position closes the valves and maintains the pressure without change. Pushing the lever back opens the exhaust valve and permits the return cylinder to act, thus raising the ram clear of the flask. The lever can be stopped in the exhaust position and held by a spring rod so that the man has simply to push it back when his hands are free for other operations. The pressure is under constant control as it can be regulated by the valve to give any desired pressure on the gauge which indicates at any time the pressure in the cylinder. This advantage is quickly and greatly appreciated by the men and especially by the foremen and masters, for it is a cheap, quick method of insuring the production of good castings. One objection frequently expressed to the power ramming machine, is that there is a large percentage of bad castings turned out, due to blow holes or scabs. These defects arise mainly on account of irregularities in the hardness of the sand, that is, in the packing. For instance, in green sand work the drag may be rammed very hard, and it is best to ram it as hard as is consistent with good work, but the cope has to be softer and in some places where there are projections on the pattern it must be left very soft. With the Universal machine the pressure can be regulated and nothing is easier than to produce in a flask a mold having certain parts hard and certain parts soft. Also, when the proper pressure for a certain class of work has once been ascertained there is no difficulty in reproducing the same conditions.

Water is brought to the valve through a stuffing box placed on the top of the hollow column, so that it is always easily accessible. The valve box in itself is very simple and of an entirely new design, so that in case a valve is to be changed the transfer can be made in a few seconds.

The platen or ramming plate is drilled with four holes for fixing ramming plates of various sizes or forms to conform to the internal shape and size of the flask. In the illustration a round plate is shown and it will be noticed that the table of the machine is also round, although in the past it has been the custom to use square or rectangular flasks. The reason for this change to round flasks will be explained later.

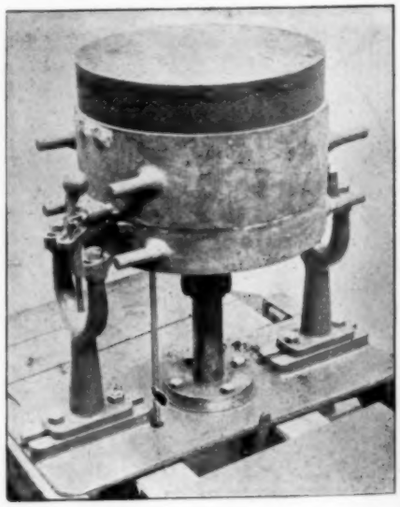

FIG. 8.—OPERATION OF THE MACHINE.

One important point noted is that

all wooden packing has been avoided, and that the face of the ramming plate is perfectly parallel to the table. The result is that with little attention if exactly the same amount of sand is used the ramming action will bring the plate just level with the flask, so that no scraping or striking off is necessary.

As explained before, the beam is arranged to revolve around a pillar, the hook being simply disengaged and pushed out of the way, as shown in Fig. 6. When the beam is rotated back away from the table it leaves the latter thoroughly accessible on three sides, thus rendering all lifting which necessitates two men very easy, one man being on each side of the machine.

The center table is arranged with an opening as large as is consistent with the strength of the table, and the latter is partially filled by detachable bars put where necessary for supporting the pattern plates. It has already been stated that many vertical cores can be made with this machine and that patching is avoided by the use of stools for pushing these cores and the stripping plate where it is necessary to use them for supporting the sand.

The stripping plates are generally made of white metal by an improved process, and it is necessary to support them at different points on account of the fact that they are cut out to the form of the pattern and hence are not strong enough to be supported by the corners only. This is why the large central opening is left in the table of the machine. Supporting rods are placed wherever they are necessary to

FIG. 9.—THE MACHINE WITH UPPER FLASK REMOVED.

support the stripping plate and stools, so that when the flask is lifted all of the rods are lifted at the same time, thus rendering the breaking of the sand impossible.

A particular refinement in the use of stools has been devised and named "double ramming motion." This is not very clearly shown in the illustration of the machine, but it consists in arranging some of the stools so that when the pressure is brought to bear upon the upper face of the mold an additional pressure can be placed upon

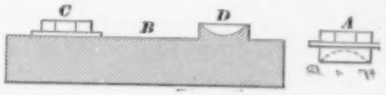

FIG. 10.—ONE OF THE PATTERNS HANDLED.

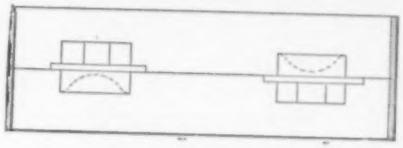

FIG. 11.—DUPLICATING THE MOLD.

the parts by advancing the stools by means of a lifting ram, the amount of this advance being limited by suitable stops or collars. By the use of this device it has been found possible to mold a locomotive slide valve with 106 babbitting holes in green sand, the cores being green sand cores formed during the molding operation.

It can readily be seen that the rods lifting the flask are adjustable, both vertically and laterally, so that the machine can be made to take a very great range of flasks and different heights of pattern plates.

This pattern of machine is made in several sizes, according to the dimensions of the flasks required. The so-called standard pattern has a table about 25½ inches in diameter and can take flasks 24 to 25 inches wide, of any reasonable length, the only limit being the available pressure. A single plate placed upon the top of the table is all that is necessary when using other flasks. The other patterns of machines are smaller and have tables respectively 22 inches and 17¾ inches in diameter. It has been found useful also to design a still smaller machine, worked entirely by hand. In this latter the ramming is accomplished by means of a screw and a fly-wheel and the lifting is accomplished by a lever worked by the foot. The small hand-power machine has been found very useful in foundries producing small castings. They are usually worked by boys and as they require no power can be set anywhere in a short time and used either in small or large foundries.

Another type of machine is manufactured which is much larger, using flasks up to 36 x 60 inches. This type is particularly well fitted for use in making molds for aluminum castings for motor cars, and also for any intricate iron castings for machines, condensers, pumps, etc., but the present article will be confined to the smaller type of machines which illustrate the principle of molding.

Assembling Machine.

Perhaps it will look strange to practical men to see a molding machine with a round table when it is the custom to use square or rectangular flasks. The reason for this is that most of the work is produced in green sand and is poured without flasks, even when making heavy castings. For this class of work the round flask has been found more convenient than the rectangular. A special machine called an assembling machine is shown in Figures 7, 8 and 9. The work of this machine is not only that of assembling molds, but also that of pushing the molds out of the flasks. One assembling machine is generally worked in conjunction with two molding machines and by the use of this device only two sets of flasks are required for each molding machine.

One particular advantage of the assembling machine is that it permits the making of very deep molds by machinery. It can be seen from the illustrations that very heavy castings are obtained by this method and that it saves flasks, time in getting the castings from the sand, and labor in returning the flasks to the machines.

The assembling machine consists of a table or bed plate with a central hole, and two lateral slides. At the center is fitted a long cylinder containing a piston. The lateral slides receive two brackets. At the center of each bracket is fixed a guide pin and on each side there is a projection

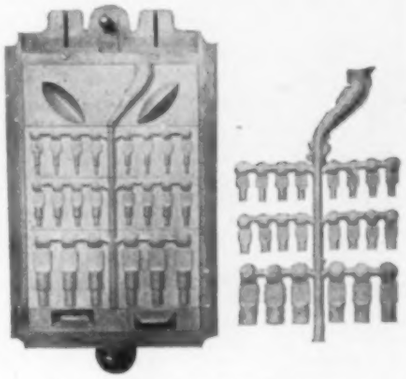

FIG. 12.—ONE OF THE PATTERNS.

arranged at a different distance from the guide pin, the right hand projection as seen from the center of the machine being nearer to the guide pin than the left. The flasks have simi-

lar projections, arranged so that when they are put on the machine with the parting line up they do not interfere with the projection of the

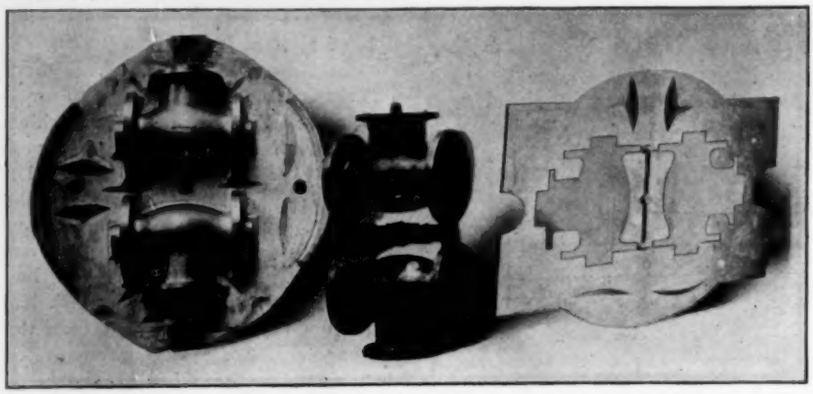

FIG. 13.—VALVE BODIES MOLDED BY REVERSIBLE SYSTEM.

machine, but when they are turned over the projection of the flask and the machine would meet. Two locking bolts are provided for locking the upper flask onto the machine. At the center of the arms near the guide pins can be seen two rods which are lifted by counterweights. These weights are sufficient to support the empty flask but not a full one. The working of the machine is well illustrated by the cuts and it will be found more satisfactory than to use snap flasks. We first find the machine with the lower flask in place. The flask is perfectly level, being supported by the platen fixed on the end of the ram, and it is at the same time accurately guided by the guide pins. Fig.

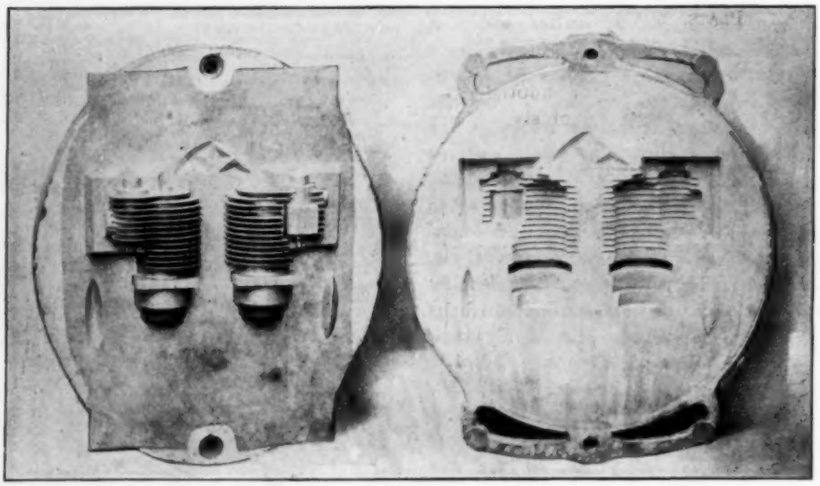

FIG. 15.—MOLD FOR AIR-COOLED CYLINDER.

7 shows the arrangement after the upper flask has been brought and placed in position with the parting line at the lower side. The upper flask is suspended above the lower by the projections upon the machine and flask coming together and is locked in position by the locking pins already referred to. Pressure is next applied to the ram beneath the machine and the two flasks or two portions of the mold assembled as shown in Fig. 8, in which the sand is seen as it is being pressed out of the mold. After the mold has been lifted clear of the flasks by means of the pressure applied it is only necessary to lift of the mold and place it upon the floor ready for pouring. The machine, after the upper flask has been unlocked and removed, is shown in Fig. 9. The lower flask remains supported upon the rods in such a way that it can be lifted off and taken away with ease. It will be noticed that the weighted rods referred to hold the flask at the top of the guide pins. This machine is very simple, effective and accurate and will be found useful in the saving of both time and labor. Of course, there are different types or patterns of assembling machines corresponding to the different patterns of molding machines.

Making Pattern Plates.

This is, without doubt, the most important part of the entire operation. Unless there are thousands of castings to be made the cost of pattern plates produced by the usual process is prohibitive, and even when the number of castings required is sufficient to warrant the expenditure, the length of time necessary to complete them is such that if castings are required quickly, it will be necessary to make part of an order by hand while waiting for the completion of the pattern plate. The Universal system has been devised to overcome these objections and includes all of the cases which arise in foundry practice. It is impossible to give a complete description of all the many applications of the process in an article of this kind, as it would fill a book in itself, but the illustrations given will show how some problems have been solved and we believe will be of interest to all practical men. It is first necessary to explain that what is known as the reversible system is used. Under the old system it is necessary to make two pattern plates to complete a casting, either by using two machines or by using a roll-over machine. The double-sided pattern plate used on the roll-over machine can be considered as two pattern plates.

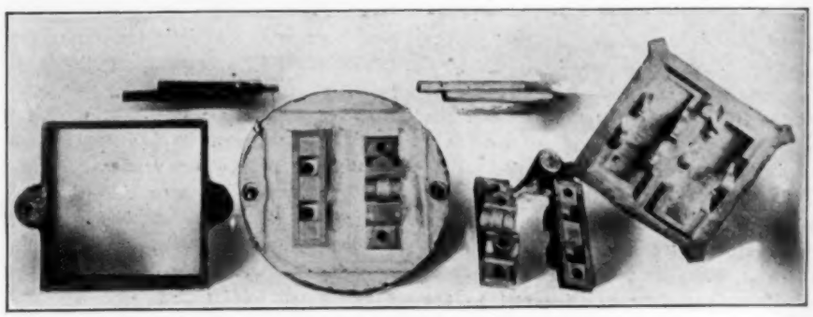

FIG. 14.—PATTERN PLATES FOR MOLDING MOTOR CYLINDER.

To illustrate the method under con-

sideration we will suppose that the pattern shown at A, Fig. 10, is to be produced and that the pattern plate is shown at the left of the figure. It will be noticed that one-half of the pattern, that is, the portion below the parting line, is located at D, while the portion above the parting line is located at C, these two parts being placed symmetrically with regard to the central axis of the plate, which passes along a line below B. The use of this plate will produce impressions, the center lines of which are equal distances from the center line of the plate B. If we then ram up two flasks exactly alike on the pattern plate, they will take on the right the impression D and on the left the impression C, and if we put the two flasks one above the other with a central line corresponding, but with the upper flask turned over, so as to bring the corresponding parts of the impressions together, as shown in Fig. 11, we will then be prepared to produce two castings like that shown at A, Fig. 10, one of which will be right side up and the other wrong side up. No doubt this machine possesses special advantages, for it requires but one machine, one man and one pattern plate. The question is to find some means of accurately locating the patterns upon the pattern plate and of doing this quickly. To accomplish this work it has been necessary to design a complete line of apparatus so arranged that, starting with the ordinary wooden pattern furnished by the customer, it is possible to produce a pattern plate therefrom in the foundry. This reversible process can be used in many ways for cutting down the work required in the production of duplicate castings.

One application of this process is named "The Cliche" process. By this, several reversible pattern plates, the cliches or sections, are inserted in a frame, or table, of given dimensions, so as to use the same size flask in each case. The sprues and the gates are on the sections so that the man does not have to cut the gates in the sand. Example of this class of work is shown in Figure 12. To change one section for another requires only the removal of six screws, the placing of the new section in the place of the one taken out and the tightening of the screws once more. The sections are made of non-shrinking white metal and are produced by a process so designed that from the pattern furnished by the customer the complete section can be put on the machine in from 30 minutes to two hours, depending upon the conditions.

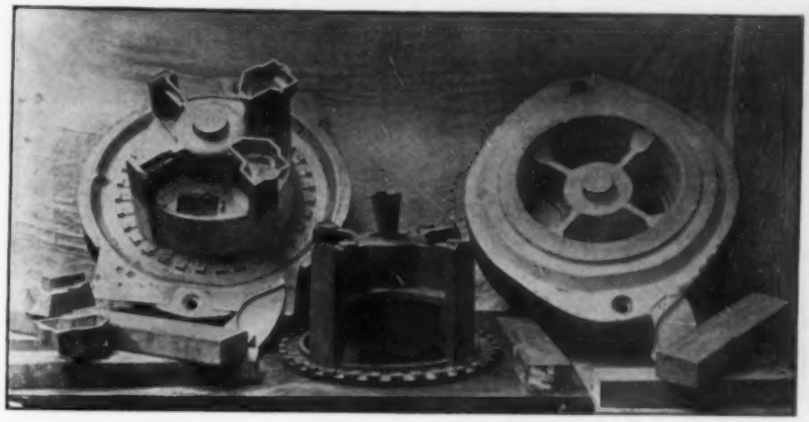

FIG. 16.—PATTERN PLATE INCLUDING STRIPPING PLATES.

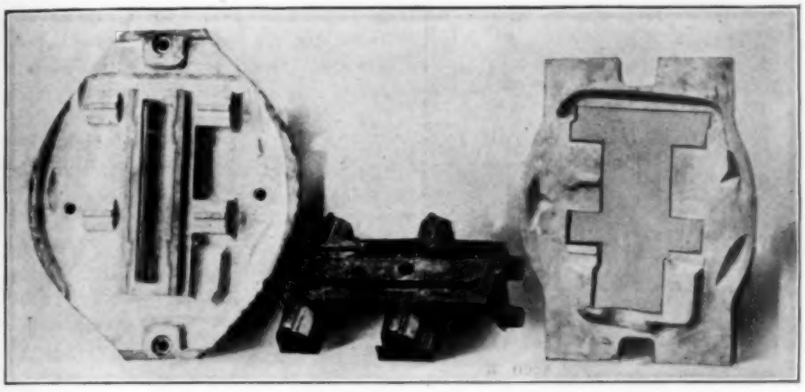

FIG. 17.—DOUBLE PATTERN PLATE.

The advantages of this process are many. First, the cost of the sections is very small, as it is much less than it would cost to produce duplicate patterns. In many cases it has been found profitable to make a section for the production of twenty castings which would never have to be reproduced again. In this case the section is simply melted down when the order is completed. The use of these special pattern plates with the sections introduced, permits the use of the machine for a long time without changing the style or size of flask when a new pattern has to be introduced. A small hurry-up order can be inserted in a very large order without losing a minute. The sections being even and of standard dimensions can be filed in racks very easily and can be found when required more readily than small patterns could in an ordinary storage system. The use of this system extends the range of the molding machine for small castings so that many times the number of

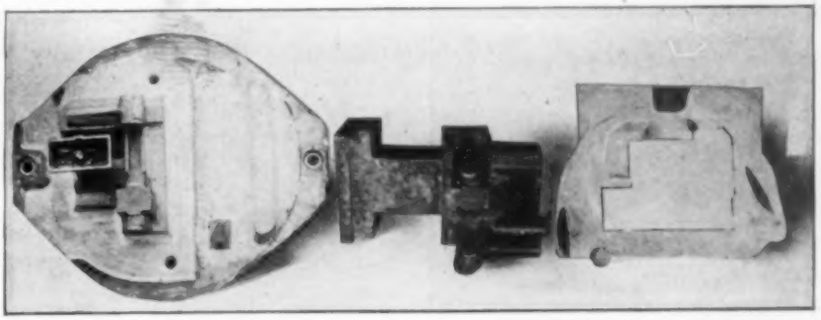

FIG. 18.—DOUBLE PATTERN PLATE.

pieces can be produced and the system can be made available for work which would otherwise not be put on the machine.

This reversible system can also be applied to larger castings. Two ex-

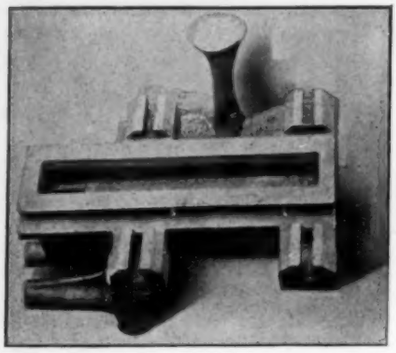

FIG. 19.—PIECE CAST FROM DOUBLE PLATE.

amples of larger castings have already been shown in Figs. 2 and 3. The pattern plate, stripping plate and castings produced therefrom for a pair of valve bodies are shown in Fig. 13, illustrating the use of this system for fairly heavy work. The pattern plates, stripping plates and stools necessary for producing a small box are shown in Fig. 14, and in Fig. 15 are illustrated a pattern plate, patterns and castings for producing an air-cooled motor cylinder. From these examples it can be seen that the reversible system is not limited to small castings, but can be applied to a large number of orders which are made with it in everyday practice. When the castings are too large for the placing of at least two in a flask of reasonable size or when it is necessary to have the castings turned out with a certain side

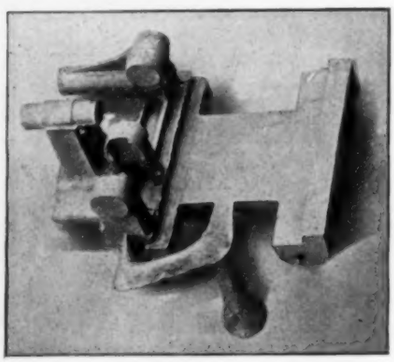

FIG. 20.—ANOTHER CASTING.

up, or when on account of the shape of the castings it is not possible to arrange them side by side it will be necessary to resort to the double pattern plate.

There is one point that must be especially emphasized and that is the use of the stripping plate with either reversible or double pattern plates. These stripping plates are made by a patent process, so that they, like the pattern plates, are produced entirely in the foundry without any special fittings. The time required for producing the stripping plate varies from one hour to two days, according to the size and the difficulty of carrying out the work. From the illustrations shown it will be seen that these stripping plates are not limited to simple forms. The parting line can be of any desired form and the stripping plate follow it. Sometimes the stripping plate includes a portion of the pattern, while in others the stripping plate is internal and supported by the stool. Sometimes one pattern plate includes several stripping plates, as in the case of the spider illustrated in Fig. 16.

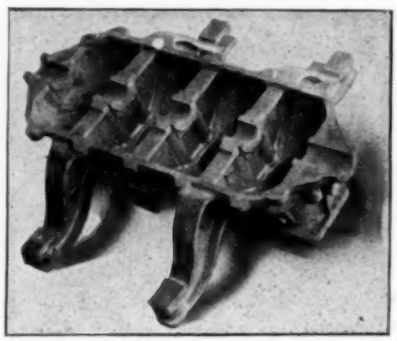

FIG. 21.—ALUMINUM CRANK CASE FOR MOTOR.

A very interesting double pattern plate is shown in Figs. 17 and 18, and the castings produced therefrom in Figs. 19 and 20. Another difficult casting which is produced by this process is the aluminum body for supporting a 4-cylinder engine in a motor car. This is illustrated in Fig. 21. It would be a very difficult matter to give a full description of this new process in so short an article, but it is easy to see that the machines can be used for a large variety of work and for shallow or deep pieces Molding machines of this type are being rapidly introduced into England, Russia, France, Switzerland, Spain and other European countries.

It is also interesting to note that several foundries in Mexico have adopted the system, as the makers have an agency in that country. The makers are also planning for an extensive exhibit of these machines at the American Foundrymen's Association convention to be held in Philadelphia, May 20 to 24, 1907.

AMERICA HELPS

TO KEEP UP PRICES IN GREAT BRITAIN.

Cheerful Feeling at the Birmingham Exchange.—Seven Ships Loading for the United States.—Germany's Prosperity.

(Special Correspondence.)

Birmingham, England, Nov. 15.—We have previously had more advances on a single Thursday than we had at the last meeting of the Exchange, but we have not for months past had a more cheerful gathering. Orders are abundant, mills are running regularly, and the foreigner has ceased from troubling. Seven ships are at present loading at Middlesbrough for the United States and Canada. On one day last week 13,000 tons were shipped from Middlesbrough to the states. Some people are becoming anxious about this heavy deportation of iron. But it is keeping up prices, which, but for this export, would probably be giving way a little. There was a rise of about a shilling in pig iron last week, and the general impression is that there will be a definite advance in a few weeks, when the buying from the local forges once more commences.

For all sorts of finished material there is very good demand. Steel is steadily becoming dearer. The South Wales Sieman Steel Workers' Association has decided to increase the price of bars to £5 7s 6d a ton. For Bessemer sheet bars £5 15s has become the realized price.

Since my last letter the Gas Strip Association raised the price of strip 5s a ton, making the standard £7 2s 6d with £7 5s for small lots. There has also been an increase in slit rods, once a great department of the trade, but now almost extinct. It has revived a little lately, owing to the demand for nails. For wire, there is a kind of scramble, this material being almost impossible to get. The dearness of steel billets is causing trouble, leaving too narrow a margin for the production of sheets and other finished materials, but makers are afraid to raise prices, the impression being that to do so would let in the competition of the Germans.

One of the most successful branches is that of galvanized hollow-ware, some firms in spite of the recent substantial advances, being full of work until next March. It is a singular fact that, although we have some rather serious labor troubles in progress,

this does not seem to have affected in the least the demand for steel.

Germany is Busy.

The chairman of an important Midland company has just published a letter from a correspondent who has been visiting Germany. He says the iron and steel works are "masthead high with orders," and one firm has orders and specifications for deliveries up to the end of June next. Tire and axle mills are months behind with their work, and the rail mills are congested. The wagon and locomotive shops are equally busy. The works are so behind that the government has now consulted with the railway companies, with the result that the syndicate of wheel and axle makers has been called upon to deliver 6,000 pairs of wheels and axles per month for the next two years. The Germans express themselves as very satisfied with their prices, as they are getting £7 10s per ton for steel bars both for home consumption and export.

Need of Technical Training.

Mr. William Somers, of Halesowen, on Saturday delivered his presidential address at the Staffordshire Iron and Steel Institute, Dudley. The speaker, who is a very well-known iron master, laid great stress upon the necessity for technical training, suggesting that the man who would be to the front should have not only practical education, but a knowledge of the underlying principles of mechanical action, and an adaptable acquaintance with physical science and chemistry. The speaker strongly urged that future managers of works should take three or four years at the Birmingham university in the engineering, mining and metallurgical sections. Mr. Somers devoted some attention to the enormous saving which might be effected by recovering the chemical by-products from the blast furnace. Many manufacturers clung to the idea that to close their works to visitors and keep their ideas to themselves was true economy. He thought that was a great mistake. There was considerably more lost than gained by such a policy. In the iron trade there were really very few "secrets," and generally the so-called secrets were very badly kept. Manufacturers were apt to be extravagent in their ideas of good workmanship. Whilst foreign competitors did all they could to accomplish cheapness our manufacturers often made expensive goods which when obsolete were still serviceable, instead of being only fit for the scrap heap. Our competitors' average of excellent work was much below our own, but so also was the average price.

Not Scared at All.

A correspondent of the *Birmingham Post* really did his best a few days ago to start a scare on the subject of American buying of pig iron. A rumor was circulated that the Americans had bought up the entire stock of warrants. The writer added:

"The entire stock of British warrants only represents a fortnight's consumption in the States, and is a mere bagatelle in a financial scare to the wealthy iron and steel corporations of America. The cornering of the English supply, however, might mean a serious disaster to the British iron trade, having regard to historic American methods."

The "methods" referred to are certain operations with which Americans are credited during the cycle boom of 1896, and in the Anglo-American tobacco trust. It must be confessed that the "alarm" has caused little concern, and in fact has fallen rather flat. The British dealers are not at all inclined to treat suspiciously people who come and take their iron away by the ship load.

There has been some little falling off in orders for constructional ironwork, which is causing some concern. The general impression is that the high prices, associated with the high bank rate, and the difficulty in borrowing money are discouraging the placing of contracts by railway companies, municipalities and other public bodies. In fact, it is thought that any further increase will prove disastrous. So far as constructional work is concerned, the prices are considered disproportionately high compared with the work in operation. The large number of contracts for the electrifying of trams are proving of great value just now.

Labor disputes on the Clyde and Tees are viewed with a good deal of apprehension. About 10,000 engineers and allied workers in and around Birmingham are threatening to strike, but the general impression is that the state of trade does not justify the payment of higher wages. Up to the present, the men talk of persisting in their demands.

Special articles in the current issue of the *Obermayer Bulletin* are as follows: "The Coke Question in the Foundry," "Cupola Practice," "The Right Way to Run a Foundry," "A New Method of Strengthening Castings," "How Bill Cooled The Gear," "Mistakes of Some Foundrymen."

ELECTRIC FURNACE METHODS OF IRON AND STEEL. PRODUCTION.

By John B. C. Kershaw.

Miscellaneous Methods and Furnaces.

The four previous articles of this series, have dealt with the electric furnace methods of iron and steel production that have received the most lengthy trials upon a laboratory and industrial scale of operations, these being the Heroult, Keller, Kjellin and Stassano processes. In the case of two of these, considerable industrial progress has been made, and the furnaces and processes may be considered as having taken a permanent place in the iron and steel industry.

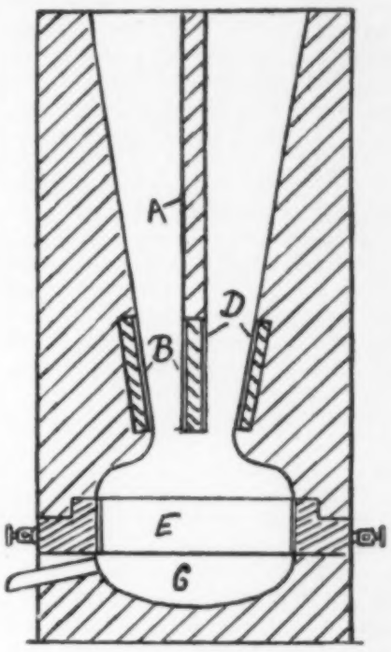

Fig. 1.—Conley Furnace.

The remaining furnaces and processes will be dealt with in this article. These have not been so long before the public and are more or less experimental in character. They are worthy of attention, however, because some of them exhibit novel features, in principle or design, and it is quite possible that one or more of these processes will prove economical and become of considerable industrial importance in the future. The furnaces and processes will be described in alphabetical order.

The Conley Furnace.

Fig. 1 is a sectional elevation of the Conley furnace. This furnace follows the blast furnace principle in design and construction. The heating and reduction of the ore are effected by contact of the crushed and well-mixed

ore, lime and coke, with transverse electrode plates fixed in the throat of the furnace. A central partition wall A is added to the usual blast furnace design, and the electric current is conveyed to the charge of ore, lime and coke, by means of the electrode plates

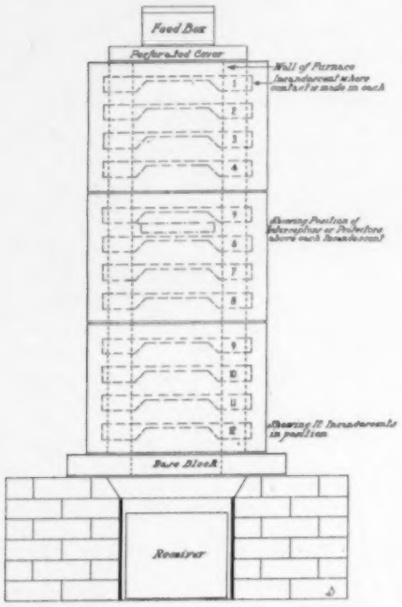

FIG. 2.—THE GALBRAITH FURNACE.

"B and D." The partially fused and reduced charge then falls on to the hearth of the furnace at C where the heating and reduction is completed by the belt shaped ring of electrode plates, E. It has been estimated that a 100-ton furnace of this type would require 5,000 horsepower and that steel ingots could be produced by it, at a cost of $11.80 per ton. The patents for this furnace were purchased by the Electric Furnace Co., of New York, and plants were designed for erection at Elizabeth Town, N. J., and Massena, N. Y., U. S. A.

No details of the practical development of these schemes for the utilization of the Conley furnace have been published, and it is probable that financial difficulties have hindered its further progress.

The Galbraith Furnace.

Fig. 2 is a sectional elevation of the Galbraith furnace, which was specially designed for smelting New Zealand iron sands. An experimental demonstration with the furnace occurred at Loughborough, England in July, 1905. The furnace in principle is a resistance heating furnace, a number of graphite resistance bars being employed in the circuit, to convey the heat generated by the electric current to the mass of ore and coke. These graphite bars are called "incandescents" in the patent claims covering this furnace, and are fixed in a tower or column in such a manner, that the iron sand and coke in the powdered state falls from one to the other in its descent from the top to the bottom of the tower. In operating the furnace, a feed box supplies a constant stream of iron sand mixed with a predetermined amount of coke or charcoal to the furnace, and this it is claimed leaves the furnace at the bottom, in a stream or shower of molten metal. The demonstration of the furnace and process at Loughborough was not very successful, and the writer is unaware whether the funds required for the development of the Galbraith process in New Zealand in connection with a large water power scheme, have yet been raised.

The Gin Furnace.

M. Gin, a French electrometallurgist who assisted in the development of the aluminum and calcium carbide industries in France, has more recently devoted himself to the subject of iron and steel production, and a very large number of patents have been taken out in his name.

A company named the "Societe des procedes Gin pour la metallurgie electrique" with a capital of 900,000 francs was formed in 1905 to take over the Gin patents relating to all branches of electrometallurgy, and arrangements have been made for trial of the Gin iron and steel furnaces at Plettenberg in Germany.

The special feature of the earlier type of furnace was the use of narrow channels to contain the metal during the heating process, this heating being effected by the resistance method. In the furnace in which the canal was bent upon itself, the narrow cross section of the canal was not convenient for the introduction of ore or scrap, and therefore a modified form has been designed, in which the heating and refining processes take place in separate portions of the furnace. The heating occurs in the narrow channels connecting the chambers in which the refining operation is carried out. When the metal has attained the required composition, a certain quantity of the finished steel is tapped, and the volume of metal withdrawn from the last chamber is replaced by an equal volume of metal heated to a high temperature from the canal leading to it. A quantity of metal equal to that withdrawn is also charged into the chamber farthest from the tap hole.

Fig. 3 gives various views of a refining furnace of this type, designed to utilize 7,200 kilowatts in the form of a current of 60,000 amperes at 120 volts. The yield from this furnace would be 350 tons per 24 hours. One may find an example of the smaller experimental furnace of this type, erected at the Plettenberg Works in Westphalia.

No details have yet been published concerning the success or otherwise of the installation at Plettenberg, but M. Gin in a paper contributed by him to the Faraday Society, London, in April, 1906, admitted that one of the difficulties met with had been to find a material for the furnace base and walls sufficiently refractory and non-conducting to prevent short circuits between the canals and chambers.

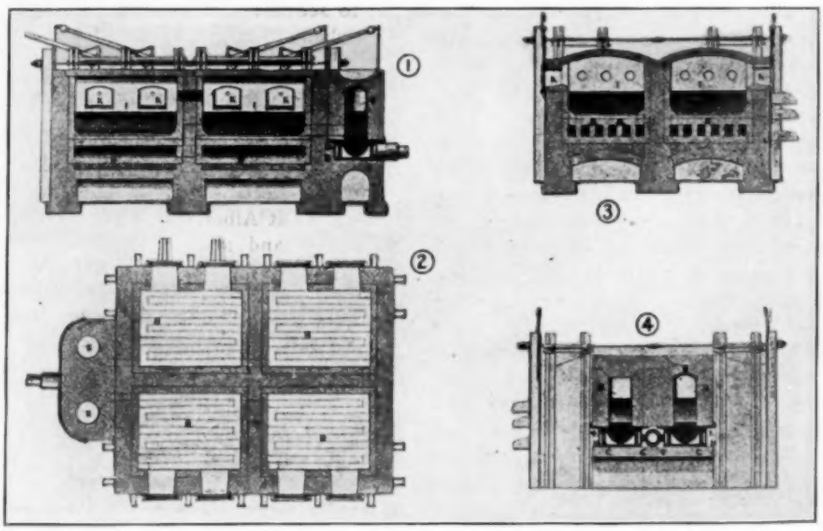

FIG. 3.—VIEWS OF GIN CHAMBER FURNACE FOR STEEL PRODUCTION.

Another type of furnace which M. Gin has designed is shown in Fig. IV.

This form is called a combination furnace, and it consists of three parts: 1. A melting and oxidizing crucible. 2. A deoxidizing and recarboreting chamber, and 3, a final mixing chamber. The electrodes enter the furnace from above, and are not shown in Fig. 4.

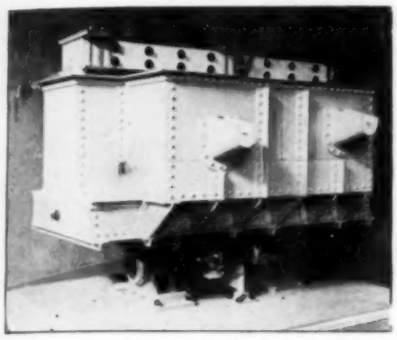

FIG. 4.—TILTING TYPE OF GIN FURNACE.

The electrodes of chamber (1) are connected to one of the current terminals, and the electrodes of chambers (2) and (3) are connected in parallel to the other terminal. The current passes from the electrodes to the metal through "a layer of scorie" the resistance of which causes the generation of heat, and then through the metal in the narrow connecting channels. Different slagging materials can be added to each chamber, in order to attain the composition desired in the final product. The furnace is held together by a metal case which rests on rollers, so that the furnace can be tilted for the removal of slag or metal. The channel between chambers 2 and 3 is so placed that it is uncovered at the moment the tapping begins. This prevents the metal of chamber (2) from mixing with that of chamber (3) during the tapping operation. By tilting the furnace in the opposite direction, the metal of chamber (2) is transferred to chamber (3) and the slag is always retained in chamber (1) in every position of the furnace. The transfer of metal from chamber 1 to chamber 2 is effected in a similar manner.

The writer is not aware that this furnace has yet received practical trial, but its great similarity in principle to the Heroult steel refining furnace, proves that it will operate successfully under proper conditions and management. It differs in principle from the canal and chamber type of furnace, in that the resistance of the scorie—i. e., the slag, is made us of to convey the heat of the electric current to the molten metal—whereas in the earlier designed furnaces the resistance of the metal itself was employed. This is likely to raise important questions of patent validity at some future date. In reply to criticisms upon this point raised at the September, 1905, meeting of the American Electro-chemical Society, M. Gin stated that the use of the slag as a heating medium was covered by his patent of February, 1897. As regards the power required to produce steel in these two types of furnace no very reliable figures are available for publication. M. Gin's own estimates give a power consumption of between 640 kilowatt hours and 720 kilowatt hours per ton of steel, for a plant designed to produce 30,000 tons per annum. With ore at 15 francs per ton and power at 80 francs per kilowatt year, the cost then works out between 82 and 83 francs per ton of finished steel, about $16.50.

In these calculations it is assumed that the iron is run into the refining furnace in the molten condition, from a blast furnace of the ordinary type. The Canadian commissioners were not able to see M. Gin's furnace in operation when they visited Europe, and therefore no independent figures are available.

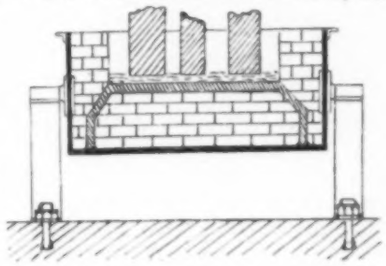

FIG. 5.—THE GIROD FURNACE (ELEVATION.)

The Girod Furnace.

M. Paul Girod occupies the post of electrometallurgist to the "Societe Anonyme Electro-metallurgique" who own works at Albertville and at Ugine in France, and also at Courtepin in Switzerland. This company is chiefly occupied in the manufacture of special ferro-alloys for steel makers, ferrotungsten being their chief product, but M. Girod has also devised a special furnace for steel refining which has been submitted to trial at the Albertville works, with successful results. The furnace is shown in sectional elevation in Fig. 6, and in sectional plan in Fig. 7. The furnace is cylindrical in shape, is mounted on trunnions, and is lined with magnesia brick. The cover is made of silica brick and through this pass several carbon electrodes, all of which are connected to one pole of the electric supply circuit. The bottom of the furnace is formed of a number of water cooled pieces of cast iron embedded in the brick work. These act as the lower electrodes of the furnace, and for a furnace two meters in diameter, fourteen of these plates are used. Each plate is in contact with the crucible part of the furnace, by means of the canals shown in section in Fig. V, these canals being filled with soft iron in the molten state before the furnace run begins. Alternating current is used. The charge consists of scrap and cast iron in suitable proportions. The upper electrodes are suspended in the slag which is made up from special ores and the decarburization of the charge is carried as far as possible, to eliminate all the impurities of the raw iron. The steel is then recarburized, by adding a calculated weight of high carbon metal. A 250-kilowatt furnace of this type has been operated at Albertville, and has produced one ton of steel from 1½-ton charges, in 4½ hours. The cost of running has been estimated as follows: Electric energy

1,060 kilowatt hours at 0.5 cent.	$5.30
Electrodes 10 kg.....	.20
Maintenance charges	1.60
Total, per ton of steel.....	7.10

Girod has also patented a large number of forms of crucible furnace in which the charge is melted by resistance heating, the crucibles being imbedded in a crushed mixture of carbon and silica, and a large number of crucibles being placed in one furnace. It is claimed for these furnaces that the temperature can be varied from 500 degrees Cent. to 3,500 degrees Cent. without difficulty, by varying the electromotive force, and that the most refractory metals and alloys can be melted in them. The furnaces are made of about 200 horsepower and work with a normal pressure of 0.25 volts. Each furnace produces about

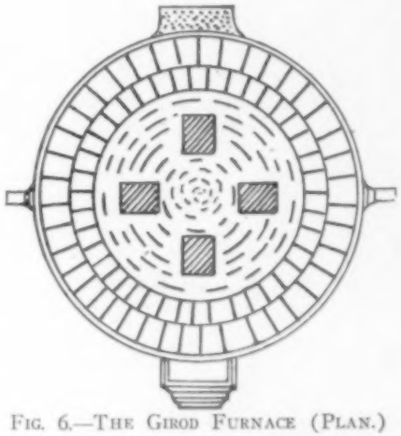

FIG. 6.—THE GIROD FURNACE (PLAN.)

2,000 kilograms of steel per day, at a cost of $4.60 per ton, with an expenditure of 1,440 kilowatt hours.

The Girod furnace has, however, not been applied upon an extensive scale for steel making up to the present time. The 15,000 horsepower available for the three works named above, have been chiefly utilized for the production of ferro-alloys, and there has not been any special effort made to push the other application of the furnace and process.

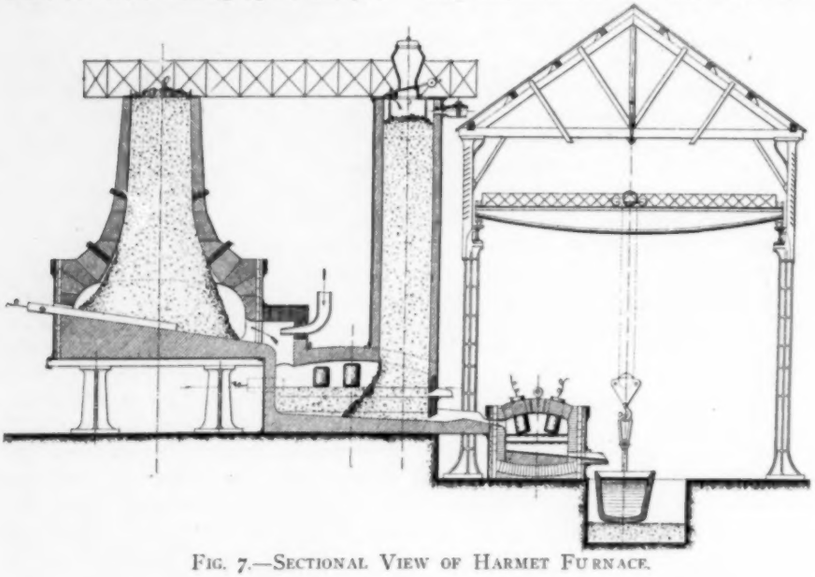

FIG. 7.—SECTIONAL VIEW OF HARMET FURNACE.

The Harmet Furnace.

M. Harmet was connected with the "Fonderies Forges et Acieries St. Etienne" when Heroult was developing his electrothermic steel refining furnace, and the furnace described below is reported to be due to M. Heroult's attempt to introduce his process of steel refining at St. Etienne.

The Harmet furnace is shown in sectional elevation in Fig. 7. The general plan comprises three parts, each corresponding to one phase of the treatment of the ore and molten metal.

In the first shaft, A, the ores are fused, in B they meet with the preheated reducing and slagging materials from the column D, and are reduced to the metallic state, while in C the final refining operation is carried out. The progress of the ore and metal through A and B is continuous, while C is tapped intermittently. The heating of the ore and other materials in A and D is effected largely by the heated gases escaping from B and C, but resistance heating is also employed, carbon electrodes being placed at suitable points in the walls of A and B (see 2, 2, 2, 2, 6, 6, 14 and 15). The heating of the metal in the refining crucible is carried out by massive carbon electrodes passing through the top of the crucible, and carrying a current of electricity which passes from the one electrode through the slag and metal back to the other electrode. The complete furnace is therefore a combination of the Keller and Heroult furnaces already described, with an attempt to utilize the heat of the waste gases, for the preliminary heating of the raw materials—coke, lime and ore.

M. Harmet has calculated that one ton of steel can be made in this furnace with an expenditure of between 2,500 and 3,600 electrical horsepower hours, and has estimated the cost at 29.24 francs ($5.60) per ton, for electric power and coke alone.

These estimates are based solely upon theoretical calculations, and must be accepted with some reserve.

The writer is not aware that the Harmet process and furnace are now in operation, although it is stated that trials of the furnace were carried out at St. Etienne a few days ago.

The Hiorth Furnace.

This furnace has recently been patented by F. Hiorth, of Christiania, and is somewhat similar in principle and design to the Kjellin furnace described in Article IV. In a view of a sectional elevation of the new design might be seen two or more furnaces being served by the one transformer coil. This is a D-shaped mass of soft iron and is mounted as shown, the coil of copper wire which conveys the current to this mass of iron and converts it into a electromagnet is wound round the vertical leg of the iron. A current of 90 amperes at 3,000 volts pressure is used to work the primary coil, and is said to be transformed into a current of 3,000 amperes at 70 volts, in the secondary circuit of the transformer, which is this case is formed by the mass of metal contained in the annular channel C, of the furnace. An efficiency of 78 per cent, and a temperature of 2,000 degrees Cent. are reported to be attained. The furnace is built as a hollow brickwork cylinder, OO. The channel which contains the iron is covered by lids LL to prevent oxidation of the metal during the refining operations. The screen R is provided to protect the coil S from the heat radiated by the walls of the furnace. A is the spout by which the metal is tapped, when ready for discharge.

The Ruthenberg Furnace.

The Ruthenberg furnace is shown in Fig. 8, a reproduction of a photograph taken from an experimental furnace erected at Lockport, N. Y., in 1902, and described by the inventor in THE IRON TRADE REVIEW of Sept. 14, 1905.

The furnace consists of two magnetic rolls, carrying an electric current between which the ore mixed with a calculated amount of carbon is fed. The ore is picked over to free it from gangue, and is crushed before use. The poles of the magnet are within the bronze rolls, which are driven by a small motor and worm gearing at a speed of four revolutions per minute. The rolls carry a current of 700 amperes at 50 volts, and are water cooled. The magnetic action of the rolls holds a bridge of the crushed particles of ore and coke in the narrow gap. The electric current passes from one roll to the other through this crushed ore and coke, before the latter is carried downwards by the revolution of the rolls and dropped into the soaking pit below.

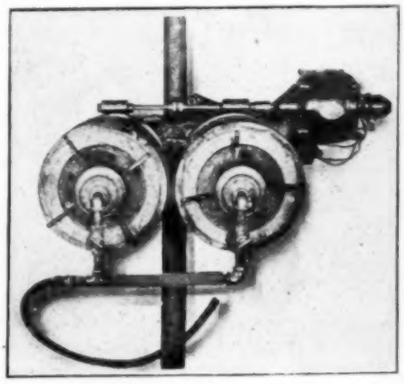

FIG. 8.—THE RUTHENBERG FURNACE.

Market Quiet With Prices Steady.

With a market of moderate activity, and in the absence of news developments of a striking character, prices maintained much the same level throughout the week on the stock exchanges. Total transactions were 5,542,200 shares on the New York Exchange, steel common being the only active issue in the iron and steel list. Virginia Iron, Coal & Coke netted a gain of 13¼ points on total transactions of 32,900 shares through and is apparently without opposition. The United States Steel Corporation, through Judge Gary, has announced that after Jan. 1 common labor at the corporation's plants will receive a 10-cent increase per day, and day and turn labor will be adjusted accordingly. About 68,000 general laborers will be affected. This action takes into account the recent heavy advance in the cost of living and is in accordance with the policy of the change and continue at high tide.

Directors of the Tennessee Coal & Iron Co. at a meeting Nov. 22, decided to issue about $4,000,000 new capital stock, making the total amount outstanding, $29,865,645. In October the stockholders voted to increase the capitalization to $50,000,000. After the new issue has been taken there will remain authorized but unissued $20,134,155. Stockholders are privileged to subscribe to the new stock

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quotation Nov. 17.	Closing Quo. Nov. 24.	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers Co	17½	17½	.....	Sept.	100	19,820,000	.....	.....	.....
Allis-Chalmers preferred	46½	45½	−1		100	16,150,000	7 cum	.....	Feb., 1904
American Can	5⅜	6⅜	+ ⅝	Apr. 24	100	41,233,300	.....	.....	.....
American Can preferred	55	55¾	+ ¾		100	41,233,300	7 cum	5 Q.	Oct., 1906
American Car and Foundry	44⅞	43¾	−1⅛	June 28	100	30,000,000	.....	.....	May, 1905
AmericanCar and Foundry preferred	101¼	101¾	+ ½		100	30,000,000	7 n. c.	7 Q.	Oct., 1906
American Locomotive	75	74⅛	− ⅞	Oct. 16	100	25,000,000	.....	1¾	Nov., 1906
American Locomotive preferred	112	111¾	− ¼		100	24,100,000	7 cum	7 Q.	Oct., 1906
American Shipbuilding	77½	77½	.....	Oct. 2	100	7,600,000	4 n. c.	1 Q.	Aug. 1906
American Shipbuilding preferred	107½	110	+2½		100	7,900,000	7 n. c.	1¾ Q.	Nov. 1906
American Steel Foundries	10	10⅝	+ ⅝	Oct. 3	100	17,700,000	.....	.....	.....
American Steel Foundries preferred	44	46½	+2½		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	72	72	.....	June 5	100	1,000,000	4	4	Dec., 1906
Barney & Smith preferred	140	140	.....		100	2,500,000	8 cum	8 Q.	Dec., 1906
Bethlehem Steel	19	19	.....	April 3	100	15,000,000	.....	.....	.....
Bethlehem Steel preferred	67¼	67¼	.....		100	15,000,000	7 n. c.	3 Q.	Nov., 1906
Bullock Electric preferred	112	112	.....	Oct. 2	100	1,000,000	6	6 Q.	Oct., 1906
Cambria Steel	37⅞	37⅝	− ⅛	March 20	50	45,000,000	6	3 Q.	Aug., 1906
Cambria Iron	48	48	.....		50	8,468,000	4	4 S. A.	Oct., 1906
Colorado Fuel & Iron	53½	54½	+1	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	15½	15	− ½	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	12¾	13	+ ¼	Oct. 17	100	25,000,000	.....	.....	.....
Crucible Steel preferred	80¾	80¾	.....		100	25,000,000	7 cum	.....	Sept., 1906
Empire Steel	6	5	−1	Feb. 28	100	2,281,400	.....	.....	.....
Empire Steel preferred	38	42	+4		100	2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	95	.....	Feb. 20	100	1,000,000	6	6 Q.	Nov., 1906
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	Nov., 1906
General Electric	174½	176½	+2	May 8	100	48,256,050	8	8 Q.	Oct., 1906
International Pump	44	42⅝	−1⅜	June 5	100	12,282,500	.....	2	July, 1905
International Pump preferred	81⅝	82	+ ⅜		100	8,850,000	6 cum	6 Q.	Nov., 1906
Lackawanna Steel	71	71	.....	March 14	100	34,971,400	.....	.....	.....
Lake Superior Corporation	16	15	−1	Oct. 3	100	40,000,000	.....	.....	.....
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	Sept, 1906
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	6 Q.	Aug., 1906
Otis Elevator Co	50	50	.....	March 19	100	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. preferred	97	97	.....		100	5,589,500	6 n. c.	6 Q.	Oct., 1906
Pittsburg Coal Co	16	17	+1	Feb. 12	100	30,135,000	.....	.....	.....
Pittsburg Coal preferred	58	59⅛	+1⅛		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	54¾	54	− ¾	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	97¾	97¾	.....		100	12,500,000	7 n. c.	7 Q.	Nov., 1906
Pullman Palace Car	260	258	−2	Oct. 18	100	74,000,000		8 Q.	Oct., 1906
Railway Steel Spring	52	53	+1	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	100	100	.....		100	13,500,000	7 cum	7 Q.	Sept., 1906
Republic Iron & Steel	36½	37⅛	+1	Oct. 17	100	27,352,000	.....	.....	.....
Republic Iron & Steel preferred	98¾	100⅛	+2⅛		100	20,852,000	7 cum	7 Q.	Jan., 1907
Sloss-Sheffield	73	75⅛	+2⅛	March 14	100	7,500,000	5	5	Oct., 1906
Sloss-Sheffield preferred	106	105	−1		100	6,700,000	7 n. c.	7 Q.	Oct , 1906
Tennessee Coal & Iron	159¼	160	+ ¾	May 15	100	22,552,800		4 Q.	Nov., 1906
U. S. Cast Iron Pipe & Foundry	46½	47	+ ½	June 27	100	12,500,000		2	Dec., 1906
U. S. Cast Iron Pipe & Foundry preferred	87⅛	88¾	+1¼		100	12,500,000	7 n. c.	7	Dec., 1906
U. S. Steel	48¾	47⅞	−1⅛	April 16	100	508,302,500	2 n. c.	½ Q.	Oct., 1906
U. S. Steel preferred	105⅛	105	− ½		100	360,281,100	7 cum	7 Q.	Nov., 1906
U. S. Steel 5's	98⅛	98	− ⅛		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	61	74¼	+13¼	Sept. 18	100	8,641,600	.....	.....	.....
Westinghouse Electric	155	155	.....	June 27	50	20,996,350	10	10 Q.	Oct., 1906
Westinghouse Air Brake	158	161	+3	Oct. 2	50	10,990,450	30	30 Q.	Oct., 1906

reports of a change in control, but otherwise changes were insignificant. The week saw the official announcement of the plan for dividing the profits to accrue from the lease of Great Northern ore lands by the Steel Corporation. Stockholders of the Great Northern are to receive trustees' certificates for an amount of stock in the Lake Superior Co., Ltd. equal to their holdings of Great Northern, the net profits of the iron ore properties to be distributed to holders of the Lake Superior Co. certificates at least once a year. This method of sharing the benefits has been widely commended

Pennsylvania company and other important industrial interests. The money market, both foreign and domestic, has improved somewhat during the week. London has secured some gold from the Bank of France and has strengthened its reserves, notwithstanding the heavy drain of gold from South America. The New York bank statement showed an increase of almost $3,000,000 in reserve with an expansion of loans to the amount of over $4,000,000. Money rates were irregular throughout the week, call loans going as high as 12 per cent. Industrial conditions generally exhibited little

on the basis of 15 per cent of the stock held. Payments are to be made in four installments, December of this year and in March, June and December of 1907.

Directors of the Barney & Smith Car Co. have declared the regular quarterly dividend of 2 per cent on preferred stock, payable Dec. 1, and a 1 per cent dividend on common stock, payable Dec. 15. Republic Iron & Steel Co. directors have voted the usual dividend of 1¾ per cent on preferred stock, with an extra 2 per cent payment on deferred dividends, reducing arrearages to 4 per cent. Both payments will be made Jan. 2.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Bellefontaine Bridge & Steel Co., Bellefontaine, O., has been incorporated with a capital of $100,000 by S. H. West, W. R. Cordrey, J. S. Deemey, A. R. Riggs and John P. Aiken.

The Cleveland Castings Co., Cleveland, has been organized with a capitalization of $25,000 by F. W. Wood, A. K. Spencer, Victor G. Farner, F. W. Treadway and William H. Marlatt.

The Ensley Machine & Foundry Co., principal office at Ensley, Ala., has been incorporated to manufacture castings. The capital stock is $2,500, and the incorporators are: W. T. Palmer, Evan J. Owen and Arthur H. Moore.

The Washburn Steel Castings & Coupler Co., Minneapolis, has been incorporated with a capital stock of $1,400,000 by W. D. Washburn, F. M. Crosby, H. L. Little, W. de la Barre, E. C. Washburn, Stanley Washburn and C. C. Crane, all of Minneapolis.

The Ferry Cap & Set Screw Co., Cleveland, has been organized with a capitalization of $50,000 by W. Shaw, Walter E. Myers, G. S. Cole, A. G. Newcomb and David E. Green.

The Elgin Tool Works, Elgin, Ill., has been incorporated to manufacture machinery. The capital stock is $20,000, and the incorporators are: R. A. Norling, A. Hasselquist and Theodore Worcester.

The Cleveland Car Co., Cleveland, has increased its capital stock from $25,000 to $50,000. F. B. Squire is president of the company and R. L. Dameldinger is secretary.

The Baldwin Steel Co., Charleston, W. Va., has been incorporated with a capital of $400,000 by Urban C. Brewer, Buckner Clay, R. S. Spilman, George E. Price and Harrison B. Smith.

The Hicks Improved Engine Brake Co., Atlanta, Ga., has been organized to manufacture fixtures, machinery and equipment for engines, cars, railroads, etc. The capital stock is $250,000, and the incorporators are: J. A. Hicks, F. O. Walsh and F. H. Hill.

The Wetmore Mfg. Co., Galesburg, Ill., has been incorporated with a capital of $2,500 and will manufacture tools and machinery. The incorporators are. G. A. Smith, Theodore L. Wetmore and G. A. Smith Jr.

The Parkersburg Specialty Co., Parkersburg, W. Va., has been incorporated to manufacture and deal in iron, steel and metal bars, generate and sell electricity, etc. The capital stock is $100,000, and the incorporators are: I. I. Fisher, A. E. Succop, H. S. Duncan, George W. Flowers and J. T. Keil, all of Parkersburg.

The Jesse L. Law Machine Tool Co., Syracuse, has been incorporated to manufacture engines, boilers and heavy hardware. The capital stock is $50,000, and the incorporators are: Jessie L. Law Jr., William T. Gray and James A. Anderson, all of Syracuse.

The American Pyrites Co. has been chartered with a capital stock of $100,000 to manufacture iron, mine ores, etc. The incorporators are: Felix A. Vogel and Alfred Kimber, 25 Broad street, New York, and Amaza Corbin Jr., Gouverneur, N. Y.

The Tidewater Iron Works, 1302 Clinton street, Hoboken, N. J., has been incorporated with a capital stock of $2,000 to manufacture articles of all kinds. The incorporators are: Fritz C. Herschel, Christian J. G. Fischer and Maurice B. Friedman, all of the address given.

The International Ore Treating Co., chartered with a capital stock of $5,000, will manufacture tools, appliances, etc. The incorporators are: Frank M. Van Wagoner, 467 West 153rd street; Phillip S. Hill, 605 West 115th street, both of New York, and H. T. L. Mead, East Orange, N. J.

The Krahn Mfg. Co., Milwaukee, Wis., has been organized with a capitalization of $6,000 to manufacture machines and tools. The incorporators are: A. W. Krahn, A. M. Hess and Lyman G. Wheeler.

The Fuller Mfg. Co., New Haven, Conn., has been incorporated to manufacture and deal in machinery and tools of all kinds. The capital stock is $25,000, and the incorporators are: H. R. Brown, S. C. Morehouse and V. A. Alling.

The Precision Machine Tool & Development Co., Cincinnati, has been organized with a capitalization of $10,000 and will manufacture tools. The incorporators are: F. A.. Wagner, H. L. Linch, E. A. Wagner, Angel Afanador and F. L. Afanador.

The Johnson Machine Works, Battle Creek, Mich., has been reorganized under the name of the Anderson Foundry & Machine Co., and will manufacture engines and machinery. The capital stock is $100,000, and the incorporators are: Thomas B. Anderson, James B. Catteau and Syra E. Lewis, all of Battle Creek.

George Wendling, C. O. Henderson, of Massillon, S. M. Brenneman, of Orrville, and others have organized a company to operate a foundry at Orrville, O. The capital stock is $5,000, and the company expects to be ready in about two weeks to turn out finished products.

The British Canadian Engineering Co., Ltd., Toronto, Ont., has been organized with a capitalization of $250,000 to carry on the business of mechanical and electrical engineers and iron founders. The provisional directors are: John J. Sutcliffe, Ernest S. Sutcliffe and Rutherford Williamson.

New Construction:—

The Wheeling Can Co., Wheeling, W. Va., states that its new factory building, now under construction, will afford 16,000 square feet of space, all on one floor. The company is also adding to its warehouse facilities for storing cans and tin plate, by erecting a building of 40,000 square feet of floor space. The equipment needed will be manufactured in its own shop after patents of Oliver J. Johnson, president of the company.

The Victor Foundry & Mfg. Co., Hamilton, O., has completed its new plant which has a capacity of 15 to 20 tons per day of light and medium gray iron castings. It is in the market for a 10-ton electric traveling crane.

The Danville Car Co., Danville, Ill., recently incorporated for $250,000, is preparing plans for an extensive plant. The erecting shop will be 240 x 320 feet, of brick construction, the mill will be 60 x 180 feet, cabinet shop 60 x 120 feet, varnish room 60 x 120 feet, blacksmith shop 80 x 120 feet, of steel, truck shop, machine shop and engine room each 60 x 120 feet. A large freight car repair shop 90 x 320 feet will also be erected. The company expects to turn out from 200 to 300 electric cars annually and repair from 2,000 to 5,000 freight cars. All machinery will be electrically driven with power furnished by the Illinois Traction System.

The Western Foundry Supply Co., East St. Louis, Ill., which recently lost its plant by fire, has begun the erection of a new structure 50 x 148 feet to cost about $15,000. The company manufactures alloys and facings.

The rebuilding of the machine shop of the Canon City & Cripple Creek Railroad Co., at Canon City, Colo., which was recently destroyed by fire, is being pushed and the plant will be ready for operation early in the new year.

The Westinghouse Air Brake Co., Pittsburg, is making important extensions at its Wilmerding plant. Now under construction at the machine foundry is a two-story building 50 x 125 feet, the first floor of which will be used as a wash room and coat room, and the second as a core room. The building is of steel, brick and concrete, and is being erected to secure better ventilation in the cleaning room, to provide a core room better suited for the work and to include the sanitary arrangements. At the floor foundry a brick and steel building 35 x 93 feet is under way and will be used as a coat and wash room. About 50 per cent of the work of these buildings is complete.

The General Fireproofing Co., Youngstown, O., manufacturing expanded metal and other similar products, has under construction a reinforced concrete building 60 x 180 feet, to be completed about Jan. 1, which will be used for the manufacture of Allsteel sectional units and filing devices for offices. In this building pin truss girder frames are used for beams and girders, expanded metal is used for floor slabs and cold twisted lug bars are used for columns. The company has under contract a brick and steel building 85 x 198 feet for the manufacture of pin truss girder frames and plans are being prepared for an addition to the power plant and a large crane over the steel bar yard. Only recently a brick building of 15,000 square feet floor space was completed for the manufacture of expanded metal lath and other products. Another building for twisting cold twisted lug bars and another to be used as a japanning department were recently completed.

The Youngstown Sheet & Tube Co., Youngstown, O., has awarded contracts for a duplicate charging machine to serve two iron-reheating furnaces for skelp manufacture. These will be installed by the Wellman-Seaver-Morgan Co., Cleveland.

The Mitchell-Van Meter Foundry Co., Pottstown, Pa., is to double its capacity.

Improvements now under way at the plant of the Wisconsin Malleable Castings Co., Milwaukee, will be completed by Jan. 1, and will double its present capacity. Two foundries 70 x 180 feet, an annealing house 70 x 240 feet, an office building and a power plant are being erected.

The Butler Foundry Co., Hamilton, O., a custom foundry for gray iron castings, is planning the extension of its present plant. Among the new equipment to be purchased is a five-ton or eight-ton traveling crane.

The Empire Foundry Co., Syracuse, N. Y., has let the contract for a two story steel and concrete building 85 x 130 feet, together with a two story pattern storage warehouse. The company expects to be ready for operation early in January, and will have a daily output of from 15 to 20 tons. All equipment has been secured with the exception of power and blower. Grant D. Green is proprietor and Thomas Van Ornum manager.

The Grand Rapids Hand Screw Co., Grand Rapids, Mich., has let the contracts for a two-story factory building 60 x 600 feet, and expects to occupy the structure in the early spring when its capacity will be practically doubled.

The Gadsden Car Works, Gadsden, Ala., has under construction a new erecting shop 100 x 500 feet, from which a daily output of 25 cars is expected.

Work on an extensive addition to the plant of the Hamilton Foundry & Machine Co., Hamilton, O., is being pushed rapidly, and will probably be completed by Jan. 1, giving the company an increased capacity of 125 per cent in gray iron castings for custom trade.

The Lorain Casting Co., recently incorporated, will build a foundry of about 25 tons per day capacity at Lorain, O. This will be run on custom work, and will supply the requirements of the Thew Automatic Shovel Co., the Brown-Cochran Co., and other local interests for machine castings. The work of construction will be pushed as rapidly as possible, and the plant will be in charge of H. B. Davidson, for many years superintendent of the Lorain Foundry Co.

The James A. Spargo Wire Co., Rome, N. Y., states that the factory building which it is planning to erect in the spring on the 12-acre tract of land recently acquired, will be 150 x 400 feet, of brick and steel construction. The company has outgrown its present plant, which it will abandon when its new plant is ready for occupation. Ample room will be provided for later enlargements. Some time during the summer the company will be in the market for a 500-horsepower engine and generator, but other equipment has not yet been decided upon.

The Thomas Iron Co has under construction skip hoists for its No. 1 and No. 3 furnaces and also the steel bins and larries at Hokendauqua, Pa. These will not be ready for use until early in the coming year, and after their completion the company expects to increase the output of its furnaces and reduce the furnace labor considerably. The Brown Hoisting Machinery Co., Cleveland, has the contracts.

The American Foundry & Machine Co., Hamilton, O., is soon to begin the construction of an addition to its plant 47 x 160 feet, two stories high. The lower floor will be equipped as a mill, clipping and shipping room and the upper floor as a machine shop, thus giving the company a much larger capacity.

The Hockensmith Wheel & Mine Car Co., Penn Station, Pa., is building a 40 x 50 foot addition to its molding department.

C. Wetmore and F. A. Crowell, of Sydney, N. S., and Mr. Derrick, of Montreal, have asked for concessions in the way of bonus, tax exemptions, etc., from the city of Sydney, for the establishment of a large rolling mill to cost about $400,000 and employ 250 hands.

The Williamson Mfg. Co., Bradford, Pa., has increased its capital stock from $50,000 to $75,000, and, according to reports, will erect a new foundry building.

The Ross-Meehan Foundry Co., Chattanooga, Tenn., is to erect a building 60 x 200 feet to be used as a pattern shop for storage purposes. A new annealing room at the plant has just been completed and ovens are now being installed.

The Cincinnati Milling Machine Co., is soon to begin the construction of its new plant to be erected at Oakley, a suburb of Cincinnati. The foundry building will be 350 x 450 feet, the pattern shop 50 x 160 feet and the power house 75 x 100 feet.

The American Machine & Mfg. Co., Cleveland, builder of cranes, power hammers and special machinery, is erecting an addition for store room purposes. Another story is also being added to a part of the present plant to provide office room, these improvements increasing the company's capacity about one-fourth. Four special two-ton revolving jib cranes were recently contracted for by the Illinois Steel Co., for rail mill No. 2. Other orders include a No. 2 front, back and tilting table, back finishing table, entering side hot bed tables, pull-ups and manipulators, a 30-inch universal plate mill and entering side and straightening tables. Deliveries

are being completed on 15 cold rolling machines for the American Steel & Wire Co.

The Hoquiam Machine Works, Hoquiam, Wash., states that its improvements include the installation of a complete gray iron and hard iron foundry, with one small cupola for repair work and special heats and another 34 inches inside diameter. The building will be 40 x 80 feet, commanded by a traveling crane, and the output will consist of miscellaneous castings, principally for saw mill purposes and for the manufacture of special machinery built by the company.

The General Railway Signal Co., which has removed its headquarters from Buffalo to Rochester, N. Y., has sold its plant in the former city, and will make important additions to its Lincoln park plant, at Rochester, where the purchase of additional land is being negotiated for.

General Industrial Notes:—

Stockholders of the Fort Wayne Iron & Steel Co., Fort Wayne, Ind., at their recent annual meeting elected the following directors: E. F. Yarnelle, John P. Evans, Robert Millard, W. J. Vesey and H. C. Rockhill. Under the present management the plant has been operated during the year on a paying basis.

The Marshall & Huschart Machinery Co., Chicago, has acquired an L-shaped tract of ground at Madison and Jefferson streets, and, it is stated, will erect a complete machinery wareroom building.

The American Car & Foundry Co. has opened its shops at Depew, N. Y., after an idleness of eight years. This was the old Union car shop plant.

The Crescent Iron Works, Norfolk, Va., has had its affairs placed in the hands of a receiver.

The McNeil Boiler Co., Akron, recently incorporated, took this action merely to transfer from West Virginia to Ohio laws.

The Richmond, Va., plant of the American Locomotive Co. recently re-elected directors and officers as follows: W. H. Marshall, president; Joseph Bryan, vice president; Leigh Best, of New York, secretary, and C. B. Dearing, treasurer; Leigh Best, Joseph Bryan, R. J. Gross, W. H. Marshall and J. E. Sague, directors. The directory board authorized the construction of a steam shovel plant 400 x 200 feet and a power plant is now being built.

The McLaughlin Iron, Steel & Rail Co., Pittsburg, is to occupy the Crum Iron & Steel Works, at Chester, Pa.

The date for the sale of the properties of the Susquehanna Iron & Steel Co., has been postponed until Jan. 2.

The plant of the Automatic Door Rail Co., is being removed from Chicago to Hillsdale, Mich.

The American Sheet & Tinplate Co. has presented to Canal Dover, O., the books and fixtures in its reading room.

The Racine Metal Stamping Co., Racine Junction, Wis., recently incorporated, succeeds to the business in stamping and manufacturing iron and steel articles heretofore conducted as a copartnership.

The Michigan Screw Co., Lansing, Mich., recently incorporated, has taken up a building practically new with a floor space of about 12,000 square feet, and is now installing machinery. It expects to be in operation by Dec. 1, and will manufacture gear blanks, pinions, bushing piston pins, studs and special screws. H. B. Lundberg is manager.

The Ideal Fence Co., Ltd., Winnipeg, Man., a recent incorporation, some time ago purchased a tract of two acres opposite the Canadian Pacific shops, at that place, and has completed a factory building 62 x 122 feet. Two fence looms are being installed, giving an output of about 300 tons a month, and the building will afford room for 10 additional machines. Special machinery will come from the Lamb Wire Fence Co., Adrian, Mich., and will be electrically driven. W. L. McGregor, of Walkerville, Ont., manager of the McGregor-Banwell Fence Co., is president; W. H. Burnham, manager of the Lamb Wire Fence Co., Adrian, Mich., is vice president; C. A. Stewart, of Winnipeg, is secretary and F. C. Stevenson, treasurer and manager.

At a recent meeting of stockholders of the Diamond State Steel Co., held at Philadelphia, the possibility of the rehabilitation of the company was considered and a committee to report on the most feasible method of reorganizing was appointed as follows: H. T. Wallace, president; G. V. Heberton, A. G. Fromuth, D. J. Driscoll, of Reading; J. S. Arndt, George Kessler, of the Integrity Trust Co.; Joseph Netter, T. F. Neilus and James A. Longstreet. This committee will report before Dec. 18, the date set by the court for the sale of the property.

Fires and Accidents:—

The main building at the car repair shops of the Lake Shore railroad, at Elkhart, Ind., burned Nov. 10, with a loss of $40,000. It is understood that it will be rebuilt immediately.

Two workmen were killed Nov. 12 at the plant of the Youngstown Foundry & Machine Co., Youngstown, by an explosion resulting from water coming in contact with molten iron.

The foundry of Timms Bros., Interlaken, N. Y., burned Nov. 19.

The plant of the American Cutlery Co., Chicago, was practically destroyed by fire Nov. 14.

The P. & F. Corbin Co., Chicago, sustained a loss of $20,000 by fire Nov. 16.

The foundry and pattern storehouse of the Capital Iron Works, Topeka, Kans., were badly damaged by fire Nov. 13.

W. H. Drake's iron foundry, at Hackettstown, N. J., was destroyed on Nov. 21, the loss being estimated at about $2,000.

Fire at Stamford, Conn., damaged the factory of the Atlantic Insulated Wire & Cable Co. in lower Pacific street on November 15, and also damaged the plant of the Excelsior Hardware Co. The loss is estimated to be about $10,000.

The El Paso Foundry & Machine Co. plant at El Paso, Texas, was damaged to the extent of about $10,000 on November 8.

As the result of an explosion of natural gas in the Toronto, Hamilton & Buffalo Railway car shops, Hamilton, Can., Nov. 7, one man was fatally burned and another painfully scorched. The loss is estimated at $10,000.

Trade Notes.—

The Firth-Sterling Steel Co. was the lowest bidder on 400 steel armor piercing projectiles, proposals for supplying which were recently opened at the navy department.

The Cincinnati Machine Tool Co., Cincinnati, manufacturing upright drills, has completed the installation of considerable new equipment which will increase its capacity about one-third.

The St. Cloud Iron Works, St. Cloud, Minn., reports a heavy trade in granite machinery of all kinds. Its polishers, lathes and column cutters have found market in the granite centers of Vermont, Oklahoma and other sections.

The Pressed Steel Car Co., Pittsburg, has recently taken orders for 1,000 gondolas for the Northern Pacific; 150 flats for the Hocking Valley; 1,000 boxes and 500 gondolas for the Seaboard Air Line; 800 hoppers for the D., L. & W., and 100 gondolas for the Newburg & South Shore.